20

INSTRUCTION BOOK

FOR

RADIO RECEIVERS BC-312-J AND BC-342-J

MANUFACTURED BY

RCA MANUFACTURING COMPANY, INC.

CAMDEN, N. J., U. S. A.

RESTRICTED

PUBLISHED BY AUTHORITY

OF

THE CHIEF SIGNAL OFFICER

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IN

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RADIO RECEIVERS BC-312-J AND BC-342-J

Page vii - "List of Illustrations"

Figure 6 should reference BC-312-J.

Figure 7 should reference BC-342-J.

Page 6 - Titles

Figure 6 should reference BC-312-J.

Figure 7 should reference BC-342-J.

Power supply illustrated in Figure 6 should be designated as DM-21-J.

Power supply illusttated in Figure 7 should be designated as RA-20.

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SAFETY NOTICE

HIGH VOLTAGES ARE PRESENT AT VARIOUS POINTS IN THESE EQUIPMENTS. TO AVOID DAMAGE OR INJURY NO ATTEMPT AT SERVICE OR REPAIR OF THESE RECEIVERS SHOULD BE MADE WHILE THE POWER SUPPLIES ARE CONNECTED TO THEM.

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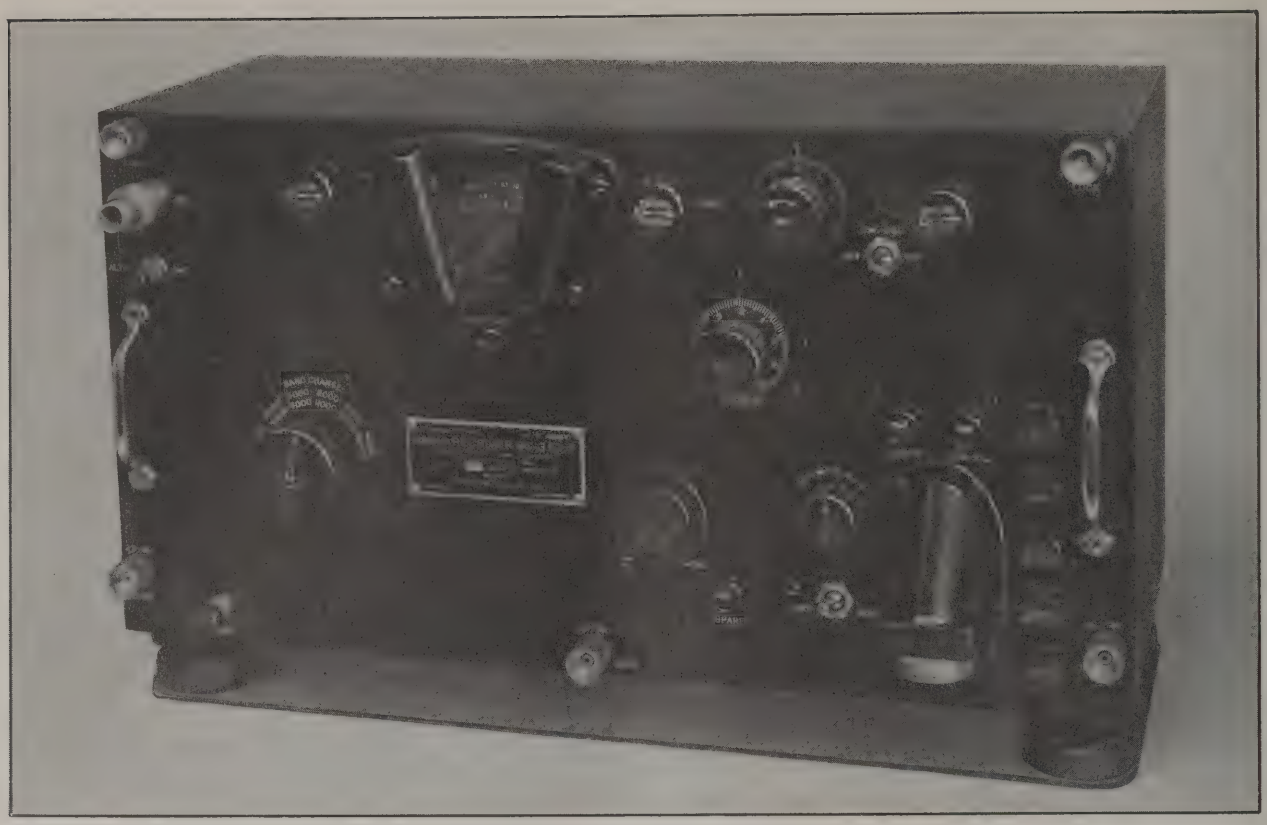


FIGURE 1—RADIO RECEIVER BC-312-J, FRONT VIEW

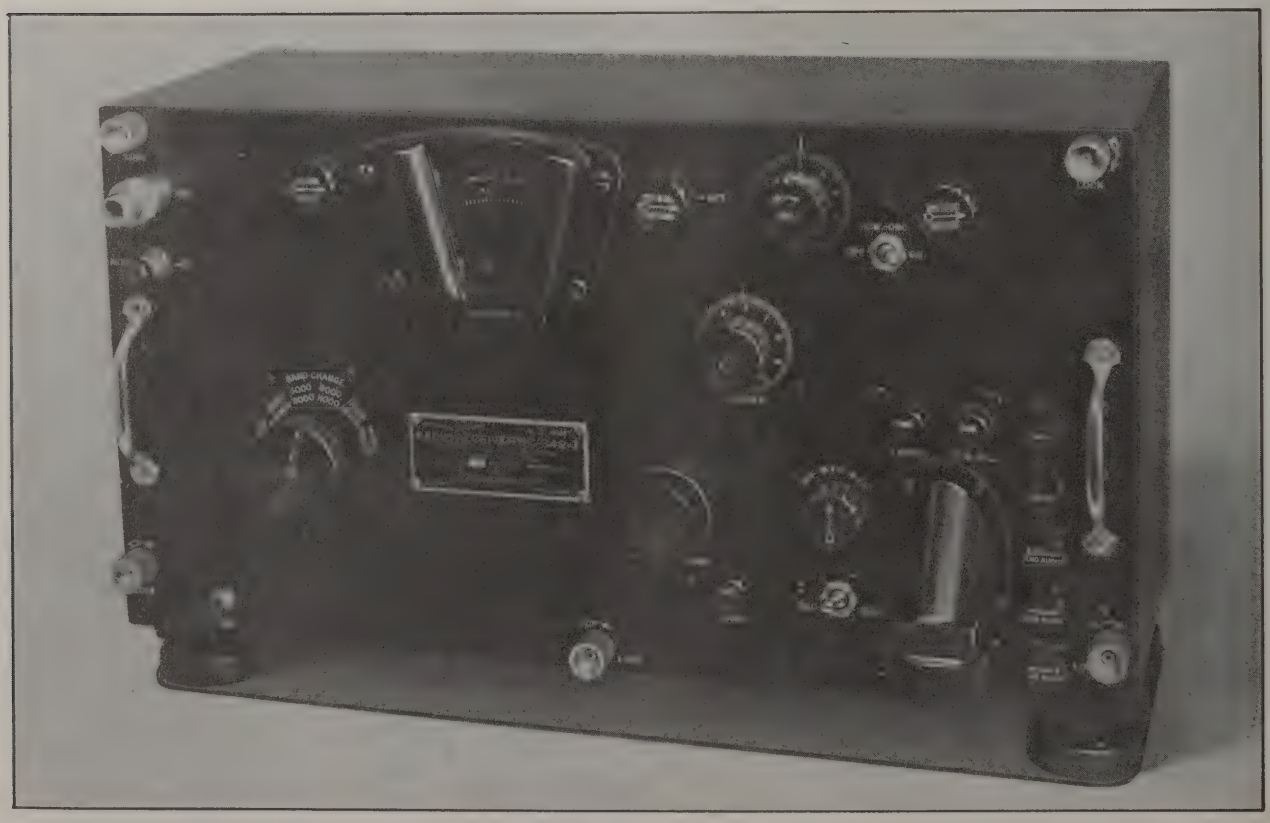


FIGURE 2—RADIO RECEIVER BC-342-J, FRONT VIEW

SECTION I

GENERAL DESCRIPTION

1 CHARACTERISTICS

a Radio Receivers BC-312-J and BC-342-J are locally controlled, six-band superheterodyne receivers for use in U. S. Army mobile equipment and for fixed ground stations. The overall frequency range of these receivers is from 1.5 to 18.0 megacycles. Nine tubes are employed in Radio Receiver BC-312-J and ten tubes are employed in Radio Receiver BC-342-J.

b All coils and the necessary high-voltage power supply unit are built into these receivers. Each receiver is shipped with the vacuum tubes, dial lights and fuses in place and, when the antenna, ground and primary power source connections have been properly made, becomes a complete and operative equipment by the addition of a telephone headset.

c Neither of these receivers is intended for remote operation and features or units necessary for this type operation have not been provided.

d These receivers are capable of voice, tone or c-w reception and either manual or automatic volume control may be selectively employed.

e Radio Receivers BC-312-J and BC-342-J are essentially alike except for the high-voltage power supply units. Radio Receiver BC-312-J is designed for operation from a 12- to 14-volt direct current power supply system and contains Dynamotor DM-21-J for this type of operation. Radio Receiver BC-342-J is designed for operation from an a-c source of 110–120-volt, 60-cycle primary power and contains Rectifier RA-20 for supplying power to the filament and high-voltage circuits. Because of the differences in the primary power switching arrangement there are minor differences in the internal connections of the two receivers.

f Radio Receiver BC-312-J requires approximately 73 watts for operation. This power is obtained from the 12- to 14-volt direct current power supply system.

g Radio Receiver BC-342-J requires approximately 86 watts for operation. This power is obtained from the 110–120-volt, 60-cycle power supply lines.

h The weight of Radio Receiver BC-312-J is approximately 56 pounds.

i The weight of Radio Receiver BC-342-J is approximately 61 pounds.

j The construction of these receivers is such that the individual r-f stages, r-f oscillator, c-w oscillator and power supply are individual assemblies, any one of which may be removed from the receiver with a minimum of disturbance to the other components. This type of construction, together with the use of metal tubes, provides very effective shielding between circuits and facilitates maintenance. Each receiver includes Mounting FT-162, which has four mountings to reduce mechanical shock. The receiver cabinet is held on the mounting by slide locks which, when pulled forward, release the cabinet from the mounting.

2 COMPONENTS

a The following is a list of the component units of Radio Receiver BC-312-J:

	Size in inches	Weight in pounds
1 Radio Receiver BC-312-J, including:	$18\frac{1}{16} \times 9\frac{7}{16} \times 9\frac{1}{16}$	56
1 Dynamotor DM-21-J ..		
1 Mounting FT-162	$18 \times 6\frac{29}{32} \times 1\frac{1}{4}$	
3 Fuses FU-21-A (2 in use, 1 spare) ...		
2 Lamps LM-27		
2 Tubes VT-65		
1 Tube VT-66		
4 Tubes VT-86		
1 Tube VT-87		
1 Tube VT-88		

	Size in inches	Weight in pounds
1 Tuning Handle		

b The following is a list of the component units of Radio Receiver BC-342-J:

	Size in inches	Weight in pounds
1 Radio Receiver BC-342-J, including:	$18\frac{1}{16} \times 9\frac{7}{16} \times 9\frac{1}{16}$	61
1 Rectifier RA-20 (which includes 1 Tube VT-97 and 1 Fuse FU-27 in place) ...		
1 Mounting FT-162	$18 \times 6\frac{29}{32} \times 1\frac{1}{4}$	
3 Fuses FU-21-A (2 in use, 1 spare) ...		
2 Lamps LM-27		
2 Tubes VT-65		
1 Tube VT-66.		
4 Tubes VT-86		
1 Tube VT-87.		
1 Tube VT-88.		
1 Tuning Handle		
1 Cap (for Socket SO-94)		

3 CONSTRUCTION

a General

Except for the differences in the power supply assemblies and minor changes in the internal connections due to differences in the power supply switching arrangement, Radio Receivers BC-312-J and BC-342-J are alike, therefore, the description which follows applies to both receivers unless otherwise mentioned.

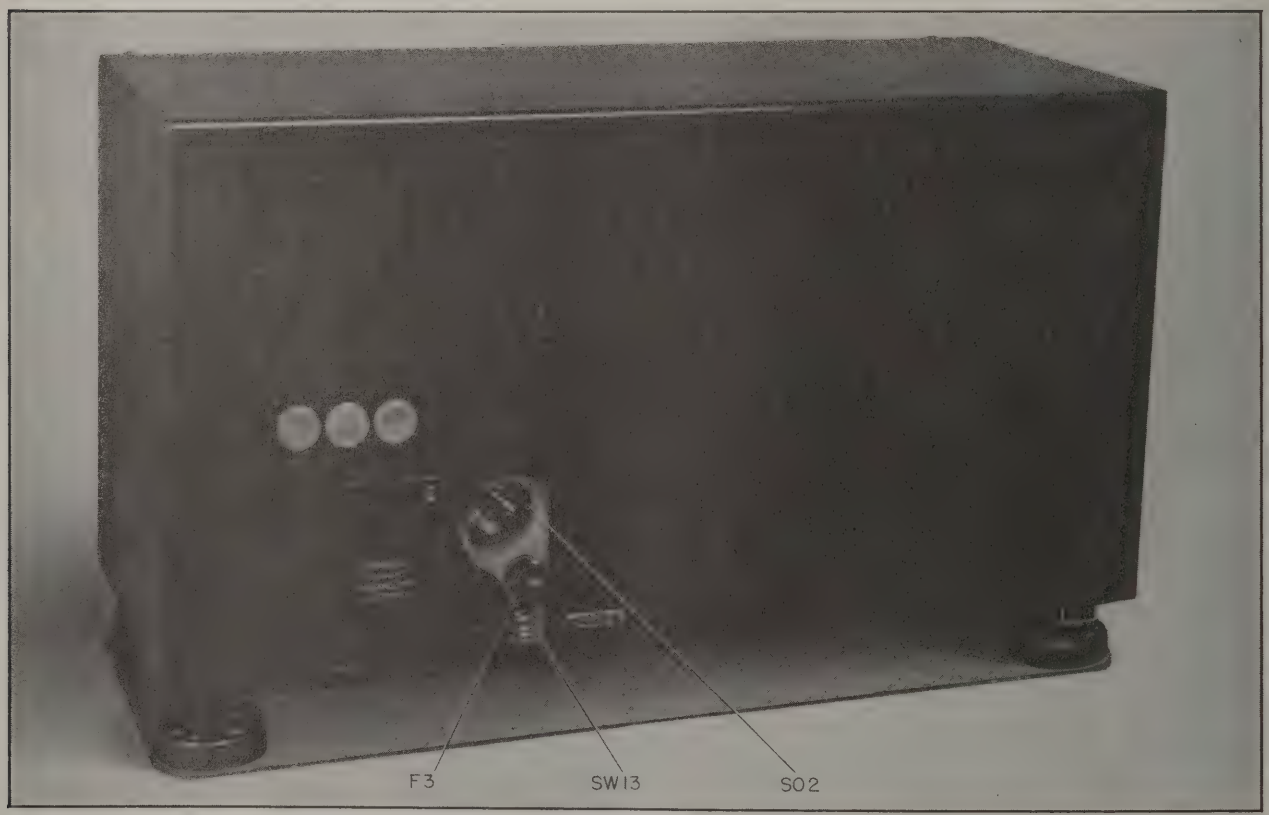


FIGURE 3—RADIO RECEIVER BC-342-J, REAR VIEW

b Cabinet

The receiver cabinet is a five-sided container fabricated from a single piece of sheet steel. The joining edges have been welded throughout their length and reenforcing steel strips have been attached to the interior of the cabinet along the front edges. Recesses for the front panel locking lugs have been provided in the reenforcing strips. An opening is provided through the rear of the cabinet to permit the power supply receptacle to be attached to Rectifier RA-20 in Radio Receiver BC-342-J. A rectangular cover plate is attached to the rear of the receiver cabinet by two fillister-head machine screws. This cover plate is located over the opening for the power supply receptacle when the cabinet is used for Radio Receiver BC-312-J. A circuit diagram of the receiver is attached to the interior of the cabinet at the bottom. Six ventilating holes covered by wire mesh are provided; three through the back of the cabinet and three through the bottom. A dead black finish is applied to the interior of the cabinet and the exterior finish is black crackle-lacquer. Two snap-slides are attached to the bottom of the cabinet; one along the right-hand side; the other along the left-hand side. These snap-slides secure the cabinet to the base Mounting FT-162.

c Base

Mounting FT-162 reduces mechanical shock and permits the receiver to be installed in a fixed position. It consists of a steel base plate, to which four shock-absorbing pedestals have been attached. Each pedestal terminates in a stud which enters the snap-slide on the bottom of the receiver cabinet. Ten holes are provided through the base plate to enable it to be firmly fixed in position at the time of installation. Black crackle-lacquer finish has been applied to the mounting.

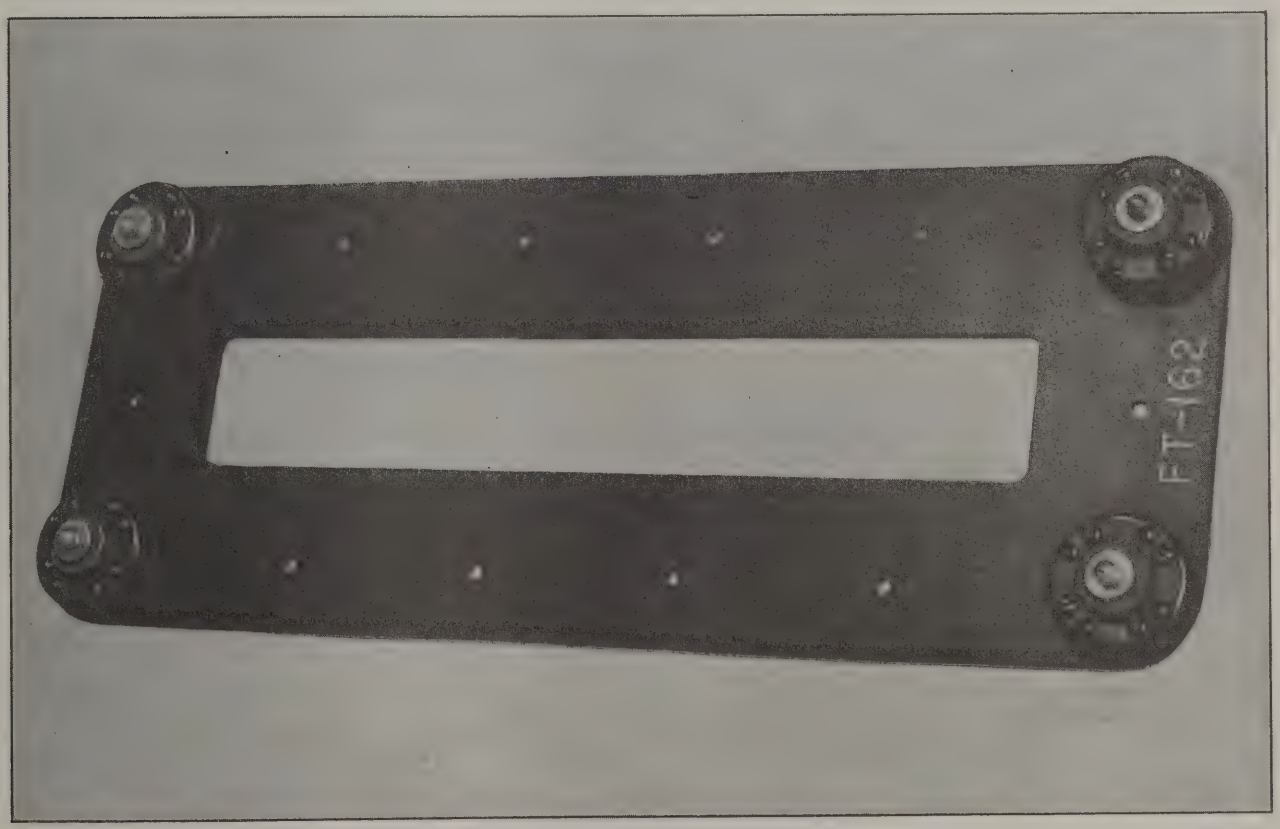


FIGURE 4—MOUNTING FT-162

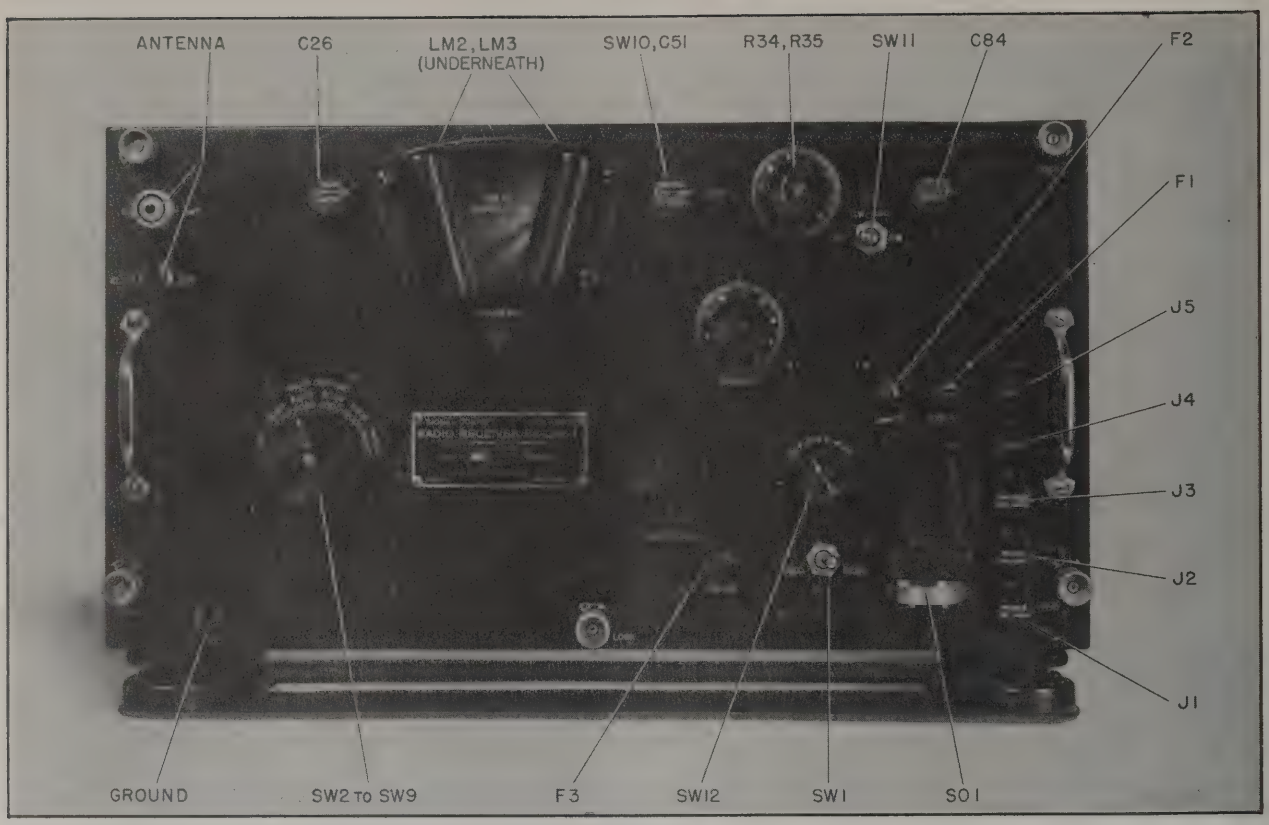


FIGURE 5—RADIO RECEIVER BC-312-J, PANEL DETAILS

d Panel

The panel of the receiver is made of an aluminum alloy finished on the front with black crackle-lacquer and on the rear with clear lacquer. All electrical components of the receiver are mounted on the panel or on a shelf which is attached thereto. The items identified in the following tabulation are located on the front of the panel:

DESCRIPTION	PANEL DESIGNATION
5 Panel locks	LOCK
1 Signal input terminal	SIGNAL ANT.
1 Signal input binding-post	ALT. SIG. ANT.
1 Receiver ground binding-post	GND.
1 Fuse	DYN.-FIL.
1 Fuse	LAMPS
1 Fuse	SPARE
1 Switch, 6 position, rotary	BAND CHANGE
1 Switch, 3 position, rotary	OFF-M.V.C.-A.V.C.
1 Jack	KEY
1 Jack	MICRO.

1 Jack	SPEAKER 2ND AUDIO
1 Jack	PHONES 2ND AUDIO
1 Jack	PHONES 1ST AUDIO
1 Control dial	ALIGN INPUT
1 Control dial	FAST TUNING
1 Control dial	VERNIER
1 Control dial	VOL.
1 Control dial	CRYSTAL PHASING
1 Control dial	C.W.-OSC. ADJUST
1 Toggle switch	REC.-SEND
1 Toggle switch	C.W.-OSC. OFF-ON
1 Power input socket, 14 contact	
2 Handles	

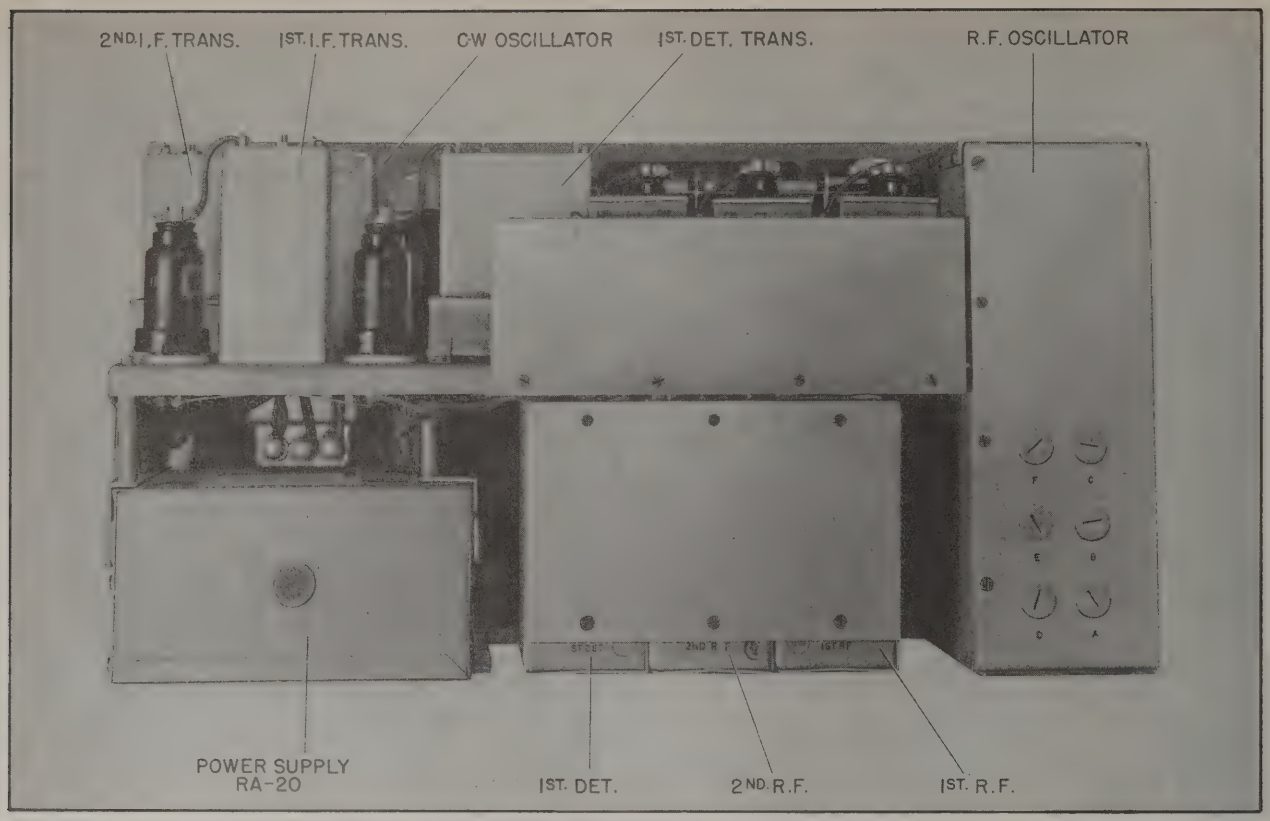


FIGURE 6—RADIO RECEIVER BC-342-J,
REAR VIEW, CABINET REMOVED

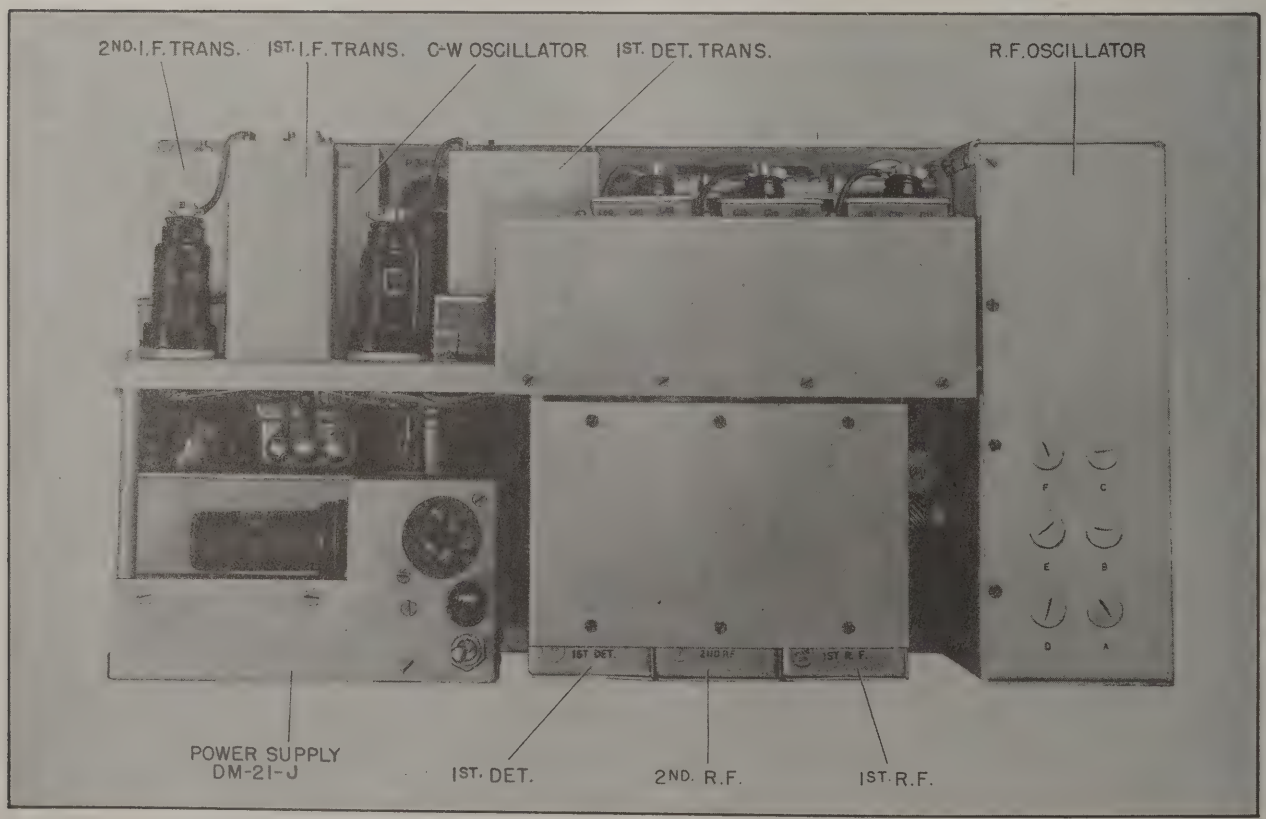


FIGURE 7—RADIO RECEIVER BC-312-J,
REAR VIEW, CABINET REMOVED

SECTION II
EMPLOYMENT

4 INITIAL PROCEDURE

a Unpacking

Be careful when unpacking or handling this equipment. When not protected by cabinets and shock mountings it may be easily damaged. Remove from the shipping box and inspect the equipment for damage that might have occurred during shipment and, if necessary, clean with a brush or blower before installing.

b Power Supply

Check the 12-volt vehicular type storage battery which is used to supply power to Radio Receiver BC-312-J to see if it is installed with the negative side grounded. Measured under load, the battery terminal voltage should not be less than 11.0 volts.

c Inspection

Radio Receivers BC-312-J and BC-342-J are shipped with the pilot lamps, fuses, and vacuum tubes in place; however, at the time of installation they should be carefully inspected to make certain that each lamp, fuse or tube is properly seated.

(1) *Pilot Lamps*

The pilot lamps may be inspected by removing the main tuning dial cover plate.

(2) *Fuses*

Radio Receivers BC-312-J and BC-342-J each have three fuses located on the front panel. These fuses are alike, each one being rated at 10 amperes. In addition to the three fuses mounted on the front panel, Radio Receiver BC-342-J has a fourth fuse mounted on Rectifier RA-20. This fuse, which has a rating of 2 amperes, is accessible through the power supply opening in the rear of the cabinet. Each fuse should be removed, inspected and replaced at the time of installation.

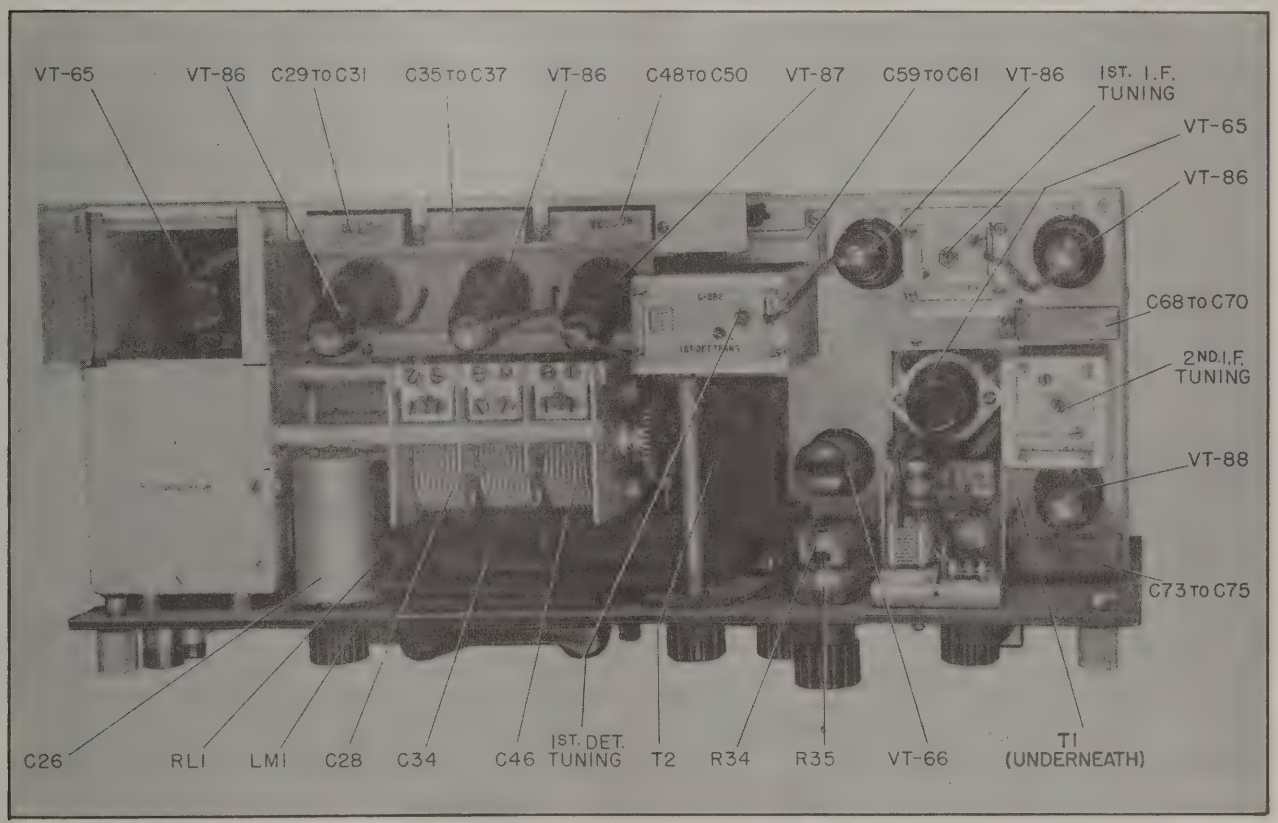


FIGURE 8—RADIO RECEIVER CHASSIS, TOP VIEW, WITH C-W OSCILLATOR SHIELD REMOVED AND R-F OSCILLATOR TUBE COMPARTMENT COVER OPEN

(3) *Vacuum Tubes*

When issued, these radio receivers are provided with tested vacuum tubes in proper position. These tubes should not be interchanged or removed from the receiver unless they become defective, since different tubes may cause misalignment. The following metal vacuum tubes are employed:

Position	Sig. Corps Type No.	Comm'l Type No.
1st Radio Frequency Amplifier	VT-86	6K7
2nd Radio Frequency Amplifier	VT-86	6K7
1st Detector	VT-87	6L7
Heterodyne or r-f Oscillator	VT-65	6C5
1st Intermediate Frequency Amplifier	VT-86	6K7
2nd Intermediate Frequency Amplifier	VT-86	6K7
2nd Detector and 1st Audio Amplifier	VT-88	6R7
Continuous Wave Oscillator	VT-65	6C5
Audio Amplifier	VT-66	6F6

(4) Tube sockets, except the radio frequency and c-w oscillator, are accessible upon removing the receiver chassis from its box. See Figure 8. To reach the c-w oscillator tube socket, remove the screw at the top of the c-w oscillator compartment and the screw located about halfway down the center of the right-hand side of the oscillator compartment. Loosen but do not remove the screw at the bottom of the rear of this compartment. Lift off the compartment cover and the tube socket is accessible. To reach the tube socket in the radio frequency oscillator compartment loosen the two screws near the top of the right rear of this compartment. Open the hinge cover occupying the rear third of the top of this compartment, and the tube socket is accessible. Tubes may be checked with the tube checker of Test Set I-56- ( ).

5 INSTALLATION

These radio receivers should be installed in accordance with installation instructions prepared and issued by the Chief Signal Officer.

6 OPERATION

a Preliminary

Insert the headset plug into the jack marked PHONES 2ND AUDIO.

b To Start the Receiver

Turn the OFF-MVC-AVC switch to either MVC or AVC.

c To Stop the Receiver

Turn the OFF-MVC-AVC switch to OFF.

d To Select Different Modes of Operation

(1) *Continuous Wave*

Throw the switch marked CW-OSC to ON.

(2) *Tone or Phone*

Throw the switch marked CW-OSC to OFF.

(3) *Manual Volume Control*

Rotate the switch marked OFF-MVC-AVC to MVC.

(4) *Automatic Volume Control*

Rotate the switch marked OFF-MVC-AVC to AVC.

e To Tune to a Given Signal

Use the control marked BAND CHANGE to select the frequency band in which the frequency of the desired signal occurs. With the switches marked OFF-MVC-AVC and CW-OSC. OFF-ON, select the correct mode of operation for the signal to be received. Using the control marked FAST TUNING, tune to the approximate frequency of the desired signal. Adjust the control marked ALIGN INPUT for maximum set noise. This insures maximum receiver sensitivity. Using the control marked VERNIER, tune in the desired signal. The control marked VOL. should be operated to secure the desired output. Turning this control clockwise increases the volume (sensitivity). The receiver is somewhat more sensitive when operated with the control marked OFF-MVC-AVC set on the MVC position. Placing this control on the AVC position reduces the sensitivity somewhat, but tends to maintain the output at a constant level as determined by the setting of the control marked VOL. The proper setting of the OFF-MVC-AVC control is therefore determined by the characteristics of the received signal.

f To Change Frequencies

To change frequencies it is necessary to tune to the new frequency in the manner described in Paragraph 6 *e*. Take care that the control marked VOL. is advanced clockwise so as to prevent passing a weak signal without hearing it.

g To Control Sensitivity

The sensitivity of the receiver is affected by the controls marked ALIGN INPUT, VOL., CRYSTAL PHASING and OFF-MVC-AVC. To obtain maximum sensitivity the control marked ALIGN INPUT should be adjusted to secure the maximum signal output from the receiver, the control marked VOL. should be turned in a clockwise direction as far as possible, the control marked CRYSTAL PHASING should be in the OUT position and the control marked OFF-MVC-AVC should be placed in the MVC position.

h To Control Selectivity

Turning the control marked CRYSTAL PHASING from its OUT position increases the selectivity of the receiver. (The operation of this control also decreases sensitivity.) The crystal phasing control is for use primarily in the reception of continuous wave signals, as it increases the selectivity of the receiver to such a degree as to distort voice signals. It may be found, however, in receiving a voice signal with a very heavy background noise or a voice signal which is very much distorted, that the proper operation of the crystal phasing control will improve the clearness of the signal. The operator should experiment with the use of this control on various types of signals in order to determine fully just what may be expected from its operation.

i To Change the Pitch of a Continuous Wave Signal

The pitch of a continuous wave signal may be changed either by operating the control marked VERNIER (which also changes the tuning of the receiver) or by operation of the control marked C.W.-OSC. ADJUST which permits a change of approximately four thousand cycles in the pitch without changing the tuning of the receiver. Once a signal has been satisfactorily tuned in, it will usually be found preferable to make desired changes in signal pitch by the latter method; i.e., by the operation of the control marked CW-OSC ADJUST.

7 OPERATING TECHNIQUE

a Interference

Power lines contribute a source of interference which reduces operating range. Such interference is particularly apparent at the higher frequencies, but operation at all frequencies is affected. There is no known method of overcoming this type of interference without sacrificing signal strength. Operation in the immediate vicinity of power lines should be avoided whenever possible. Power or telephone lines closely paralleling a road may give rise to phenomenon which is apparent in the receiver as a periodic increase and decrease of a signal intensity as the road is traversed. This is produced by standing waves on the lines. The use of automatic volume control will minimize this variation.

b Preliminary Warm-Up

For most satisfactory operation a 15-30 minute warm-up period should be allowed before the starting operation.

c MVC for Either TONE, VOICE or C.W.

This mode of operation is recommended for reception of very weak signals, since it insures maximum receiver sensitivity.

d AVC for Either TONE, VOICE or C.W.

This mode of operation is recommended for use in the case of fluctuating signals, providing the signal level is sufficiently high at all times to permit the slight loss of sensitivity caused by its use.

e Crystal Filter

(1) Because there is an increase in selectivity with the use of the crystal filter in net operation, this filter should be used only during such periods of operation. During all stand-by periods, the CRYSTAL PHASING control (SW_{10}) should be turned to OUT to increase the probability of hearing a calling station.

(2) The crystal filter may be used in either of the modes of operation desired in the preceding paragraphs *7c* and *7d* to increase selectivity and decrease background noise. The use of the crystal filter reduces the sensitivity of the receiver and this characteristic may pre-

vent its use on extremely weak signals. Although the crystal filter was designed primarily for use in connection with continuous wave signals, it may be found that in certain cases of poor voice reception its use will increase the intelligibility of the received signal.

f Grounds—Bonding

A form of static interference sometimes occurs because the components of the radio equipment or metal parts of the vericle are not grounded properly. This condition permits building up of static charges which, when they reach a sufficient magnitude, discharge to ground and produce a sound in the headset. This type of interference may be prevented by care in grounding the radio equipment in the prescribed manner and also by thoroughly bonding (connecting) all metal parts of the vehicle so that there is no possibility of a difference in potential building-up between any two sections.

SECTION III
FUNCTIONING OF PARTS

8 CIRCUIT CONTROLS

a Radio Frequency Tuning

The main tuning dial is of the flat-disc type carrying seven scales, six of which are calibrated in frequency. The seventh is arbitrarily calibrated with 45 divisions. The dial is driven through an arc of about 300 degrees by means of either of two front panel controls. The control marked VERNIER provides for a 90 to 1 reduction. The control marked FAST TUNING provides for a 25 to 1 reduction. In addition, the control marked VERNIER carries a scale graduated with 100 equal divisions permitting interpolation of the 0-45 scale of the main dial. Illumination of the main dial is provided by two pilot lights. A masking plate rotates in conjunction with the band-changing mechanism and covers portions of the dial not in active use, thus preventing any possibility of reading the wrong frequency band.

b Band Changing

(1) The six-position rotary control marked BAND CHANGE operates switches located in the radio frequency oscillator, first radio frequency amplifier, second radio frequency amplifier and first detector compartments and, in addition, operates the masking plate referred to above. All unused coils are grounded.

(2) The band of frequencies (excluding overlap) covered by the receiver for each position of the BAND CHANGE switch is indicated on the front panel adjacent to the switch. These markings are as follows:

Band	Panel Marking
A	1500- 3000
B	3000- 5000
C	5000- 8000
D	8000-11000
E	11000-14000
F	14000-18000

c OFF-MVC-AVC Switch

The three-position rotary switch marked OFF-MVC-AVC permits the selective use of either manual volume control or automatic volume control. This control also serves as the power on-off switch.

d Antenna Alignment Control

The control marked ALIGN INPUT permits tuning the receiver input circuit to resonance with antennas having a capacitance between 50 and 200 micromicrofarads.

e Continuous Wave Oscillator Controls

The two-position toggle switch marked C.W.-OSC. OFF-ON permits the continuous wave oscillator to be used when desired. The control marked C.W.-OSC. ADJUST enables the beat frequency, produced by operation of the continuous wave oscillator, to be adjusted through a range of 4,000 cycles.

f Volume Control

A control marked VOL. operates a dual potentiometer for volume control.

g Crystal Filter

A control marked CRYSTAL PHASING permits the use of a crystal filter. This filter is in the circuit at any position of this control except the position marked OUT. The purpose of the crystal filter is to provide an increase in the selectivity of the receiver.

h Input Terminals

Two antenna binding posts are provided. The upper terminal, marked SIGNAL ANT., is used to connect the concentric line (from the antenna) to the receiver; the lower terminal, marked ALT. SIG. ANT., is intended for use in installations where a concentric line is not available. The terminals are connected in the receiver.

i Send-Receive Switch

When the toggle type switch marked REC.-SEND is placed in the SEND position and when the key is in the jack, closing the key will energize the coil of the antenna grounding relay (RL_1) causing the operation of that relay. It is possible, through connections which are available in the power supply socket (SO_1), to operate the antenna grounding relay from an external position.

j Fuses

Three fuse holders are mounted on the front panel in such a way that the fuses may be removed without removing the chassis from the cabinet. The fuse marked LAMPS protects the dial lamps. The fuse marked DYN.-FIL.

protects the circuit supplying dynamotor and filament power. The fuse marked SPARE is available to replace either of the other fuses when necessary, since both are identical.

k Panel Jacks

Jacks marked as follows are located on the front panel:

(1) **KEY** — Used in Radio Receiver BC-312-J to connect a telegraph key to the transmitter. This jack is connected but is not normally used in Radio Receiver BC-342-J.

(2) **MICRO** — Used in Radio Receiver BC-312-J to connect a microphone to the transmitter. This jack is connected but is not normally used in Radio Receiver BC-342-J.

(3) **SPEAKER 2ND AUDIO**—Used to connect a loudspeaker to the receiver. In Radio Receiver BC-312-J this jack carries an extra contact which is wired to provide the necessary field current to any dynamic loudspeaker which uses a 12-volt field coil. In Radio Receiver BC-342-J the coil connection has been omitted.

(4) **PHONES 2ND AUDIO** — The headset plug may be inserted into this jack when the maximum output of the receiver is required.

(5) **PHONES 1ST AUDIO** — The headset plug may be inserted into this jack when the received signal is of sufficient intensity.

l Power Socket

Power connections to Radio Receiver BC-312-J are made through a 14-contact socket mounted on the front panel of the receiver. The leads from this power socket to the interior of the receiver are protected by a metal cover attached to the front panel with machine screws. By removing this protective cover the connections to the interior of the receiver are accessible without removing the receiver from the chassis. The power connections to Radio Receiver BC-342-J are made through the receptacle which is mounted on Rectifier RA-20. This receptacle is available through the rear of the cabinet.

m Panel Locks

Five panel locks are provided to secure the chassis of the radio receiver in its cabinet. These panel locks operate by turning the panel lock knobs in a clockwise direction. This action turns a lug into a keyway in the receiver cabinet anchoring the receiver chassis firmly against a rubber gasket. To remove the receiver chassis from its cabinet, turn the panel lock knobs in a counter-clockwise direction until the lugs clear the keyways.

9 CIRCUITS

a General

Figure 9 is a functional circuit diagram showing the connections set up by the band-change switch to receive a signal in one particular frequency band. In this functional diagram the band-change switch and all coils and capacitors not essential to the operation on that band have been omitted for the sake of simplicity. These radio receivers employ two stages of pentode radio-frequency amplification, a hexode mixer and separate triode radio frequency oscillator, two stages of pentode intermediate-frequency amplification, a duo-diode-triode detector combined with one stage of audio-frequency amplification and AVC, and a separate stage of pentode audio-frequency amplification. A separate triode oscillator is provided to produce a beat note for continuous wave reception. The antenna circuit of the receiver provides a means of transferring the desired signal to the first radio frequency stage. The two radio frequency stages provide selectivity and reduce possible interference from signals occurring at either the intermediate frequency or at the so-called repeat point (image frequency). The mixer tube circuit with its associated oscillator adds to the selectivity of the receiver and changes the frequency of the signal from the frequency received to that to which the intermediate frequency amplifier is tuned. The intermediate frequency stages provide additional selectivity and gain. The 2nd detector tube rectifies the amplified signal for audibility and provides AVC. The audio-frequency stages provide additional amplification. The continuous wave oscillator, operating at a frequency slightly different from that to which the intermediate frequency stages are tuned, provides an audible beat frequency when receiving a continuous wave signal.

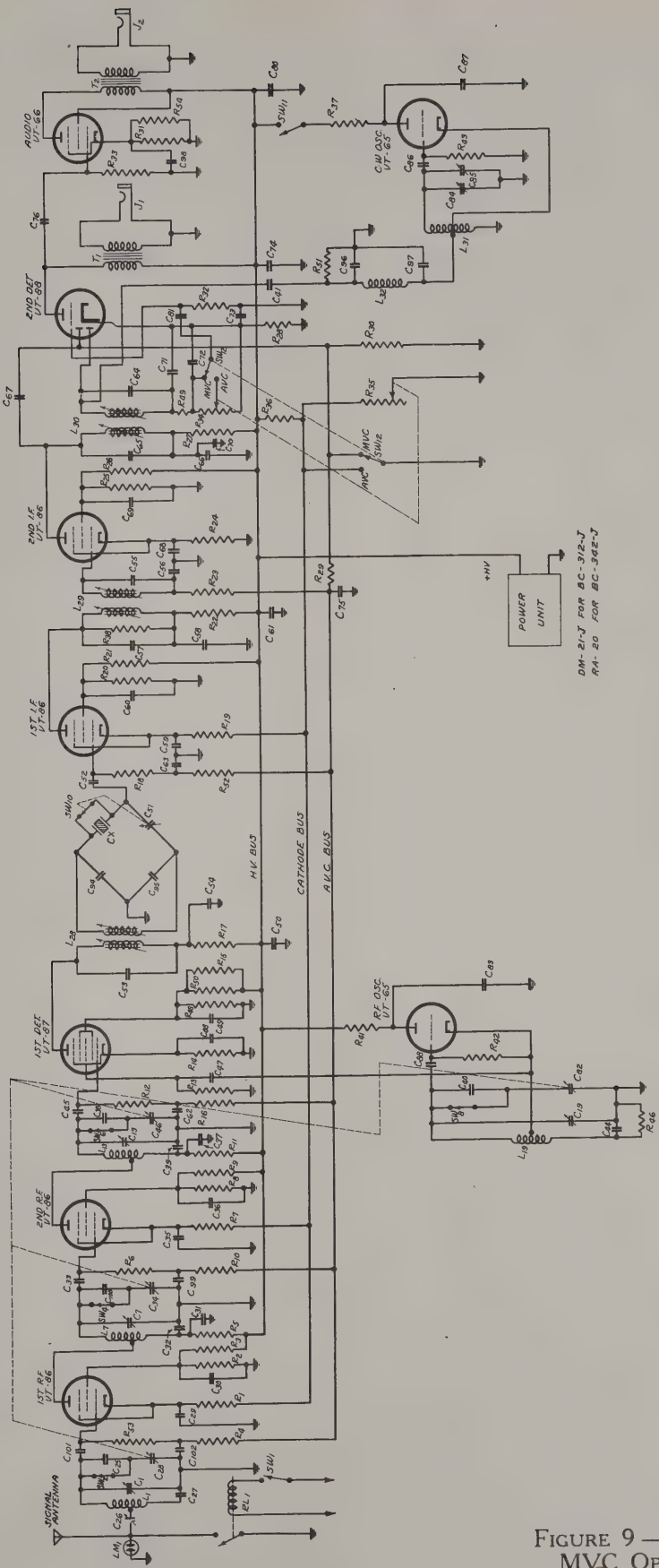


FIGURE 9 —SIMPLIFIED SCHEMATIC M.V.C. OPERATION, "A" BAND

b Antenna Circuit

The antenna circuit is coupled to the tank coil of the first radio frequency stage (L_1) through capacitor C_{26}. Capacitor C_{26}, controlled by the knob on the front panel marked ALIGN INPUT, is adjustable and permits tuning the antenna circuit to resonance with the incoming signal frequency. LM_1 is a neon lamp which normally has a very high resistance. When a certain threshold voltage is exceeded this lamp becomes a conductor by ionization and prevents further rise in voltage. The lamp is used in this circuit to protect the receiver from any dangerous voltages which might be applied to the antenna.

c Radio Frequency Circuits

The circuits of the first radio frequency, second radio frequency, and mixer stages are very nearly identical. This type of design is necessary to permit tuning these three circuits with a single-control gang capacitor. The screen voltage for the tubes in the above mentioned stages is provided by voltage dividers which are connected between plus plate voltage and ground. Resistors R_2 and R_3; R_8 and R_9; and R_{48}, R_{15} and R_{50} form these voltage dividers. The screen grids are by-passed to ground by capacitors C_{30} and C_{36} and C_{49}. Cathode bias for the first and second radio frequency tubes is partly fixed and partly variable. The fixed portion of this bias is secured by the drop across resistors R_1 and R_7, respectively, and from the junction of these resistors to the variable bias at the voltage divider formed by the fixed resistor R_{36} and the adjustable resistor R_{35}. These resistors are connected between plus plate voltage and ground so that a change in the value of R_{35} will cause a change in the first and second radio frequency cathode bias. Resistor R_{35} is shorted to ground for AVC operation and in this mode of operation the cathode bias of these tubes is secured entirely by the drop across resistors R_1 and R_7. The cathode bias of the mixer tube is secured by the drop across resistor R_{14}. The individual cathode biasing resistors, R_1, R_7 and R_{19}, are by-passed to ground by capacitors C_{29}, C_{35} and C_{48}, respectively. In the second radio frequency and mixer stages capacitors C_{33} and C_{45} prevent the plate voltage on the tube in the preceding stage from reaching the grid. Capacitor C_{101} in the first radio frequency stage is used to insure that the grid circuit of this stage is identical with those of the two succeeding stages, thus permitting the gang tuning referred to above. The coils L_1, L_7 and L_{13} are the tank inductances for the grid circuits of the first radio frequency, second radio frequency and mixer stages respectively. These tanks are tuned by three sections of the gang capacitors C_{28}, C_{34} and C_{46}. In series with the sections of this gang capacitor are three fixed capacitors, C_{25}, C_{100} and C_{38}, across which a gang control switch, SW_2, SW_4 and SW_6 (operating with the band change mechanism), is placed, permitting these series capacitors to be used in the three higher-frequency bands to obtain a greater frequency spread on the dial and shorting these capacitors in the three lower-frequency bands. Trimmer capacitors C_1, C_7 and C_{13} are provided to permit individual preadjustment (alignment) of the three circuits involved with one setting of the gang tuning capacitor. Capacitors C_{32} and C_{39} serve to prevent shorting the plate supply of the tubes involved to ground through the tank inductances. Capacitor C_{27} in the first radio frequency stage is placed in the circuit to insure circuit identity for purposes of gang tuning. Capacitors C_{102}, C_{99} and C_{62} act as by-pass capacitors for AVC operation. Resistors R_4 and R_{53}, R_6 and R_{10}, R_{12} and R_{16} provide a high-impedance d.c. grid return for the tubes involved and also provide the path through which AVC voltages are applied. The grid return of these three stages is made through resistor R_{29} to ground for MVC operation. The purpose of R_{30} is explained in detail in Paragraph 9*j*. Resistors R_5, R_{11} and R_{17} are connected in series with the plate leads of the tubes involved and, with capacitors C_{31}, C_{37}, C_{50} and C_{54} serve to reduce the amount of radio frequency reflected back into the power supply circuit from these tubes to a negligible quantity.

d Radio Frequency Oscillator

The radio-frequency oscillator employs a modified Hartley circuit with the plate end of the tank circuit operating at ground potential for radio frequencies. The tank circuit of this oscillator consists of inductance L_{19}, which is tuned by capacitor C_{82}. C_{82} is ganged with the main tuning capacitors C_{28}, C_{34} and C_{46}. Capacitor C_{40}, in series with

C_{82}, is used in the three highest frequency bands to obtain greater frequency spread on the dial. This capacitor is shorted out by switch SW_8 in the three lower frequency bands. Capacitor C_{19} is a trimmer capacitor which permits tracking the oscillator stage with the other tunable stages of the receiver. Capacitor C_{44}, while not essential to the functioning of the oscillator circuit alone, is included in this tank circuit to permit tracking with the radio frequency stages and the mixer. C_{88} serves as a grid-blocking capacitor and R_{42} as a grid-bias resistor. Resistors R_{41} and R_{46} together serve to reduce the plate voltage from that supplied by the power unit to the proper value for this tube. The value of R_{46} is changed for the different frequency bands on the receiver to insure that the plate voltage on the oscillator tube will be correct for each band. The plate circuit of the oscillator is completed, for radio frequencies, through capacitor C_{83} and ground to the tank circuit. The radio-frequency voltage occurring between the cathode of the oscillator tube and ground is impressed on the injector grid of the mixer tube through capacitor C_{47}. The action of the oscillator produces a 470 kc signal in the output of the mixer tube having the same modulation as the signal received in the antenna. The intermediate-frequency amplifier is tuned to 470 kc.

e Crystal Filter

See Figures 9 and 10. The output of the mixer stage is inductively coupled to the grid circuit of the first intermediate frequency stage through transformer L_{28}. Capacitor C_{53}, in parallel with the primary of this transformer, forms a resonant circuit which is tuned to 470 kc by varying the position of an iron core within the transformer coil. The secondary of this transformer and both coils of transformers L_{29} and L_{30} are tuned in a similar manner. On the secondary side of transformer L_{28} there is a bridge circuit consisting of capacitors C_{94}, C_{95} and C_{51} and crystal CX. The crystal is provided with a shorting switch SW_{10}. With this switch closed the secondary of L_{28} and capacitors C_{94} and C_{95} form a resonant circuit tuned to the intermediate frequency. Under these conditions one half of the available voltage across the secondary of inductance L_{28} is impressed on the grid of the first intermediate frequency tube through blocking capacitor C_{52}. When the switch SW_{10} is open (that is, by turning the control marked CRYSTAL PHASING from the OUT position) the signal is impressed on the grid of the first intermediate frequency tube through crystal CX and through capacitor C_{52}. The crystal CX is ground to the intermediate frequency of 470 kc and behaves as a sharply tuned resonant circuit, thus

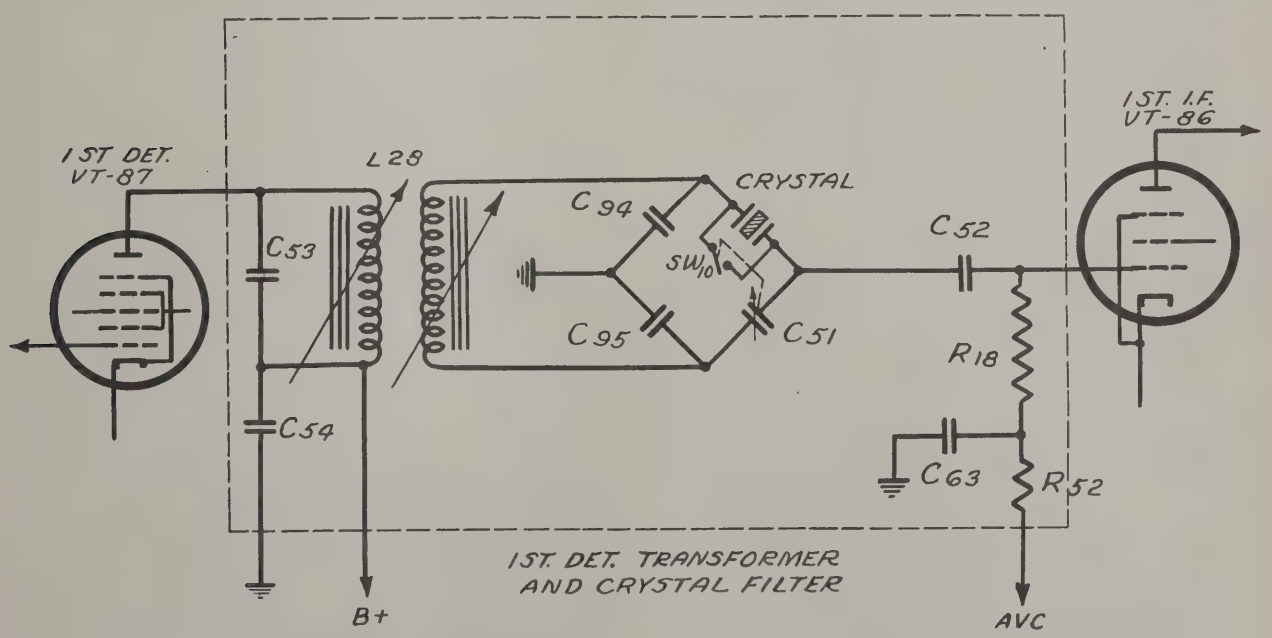


FIGURE 10—CRYSTAL FILTER CIRCUIT

presenting a high impedance to all frequencies except its resonant frequency. The capacity of the crystal holder would normally serve as a by-pass which would reduce the impedance of this resonant circuit. For this reason the bridge circuit, consisting of capacitors C_{94}, C_{95}, C_{51} and the crystal CX is employed. The proper adjustment of capacitor C_{51} will balance out the effect of the crystal holder capacitance and will thus raise the impedance of the circuit to a maximum at undesired frequencies. Any other adjustment of capacitor C_{51} provides a by-pass around the crystal and reduces its impedance to undesired signals. The control for C_{51} is referred to as the CRYSTAL PHASING CONTROL, since the crystal, neglecting the effects of the holder, behaves as a resonant circuit with the current and voltage very nearly in phase. Introducing a capacitance disturbs this condition of resonance and introduces a phase angle between the current and voltage, the magnitude of which is determined by the degree of unbalance.

f Intermediate Frequency Circuits

A resistor R_{18} provides a high-impedance d.c. grid return for the first intermediate frequency tube and in series with resistor R_{52} provides for the introduction of AVC voltage. Capacitor C_{63} is a by-pass to ground which shunts radio-frequency out of the AVC circuit. The coupling between the first and second intermediate frequency stages and between the second intermediate frequency stage and the second detector is inductive through transformers L_{29} and L_{30}. Both sides of both of these transformers form circuits which are resonant to the intermediate frequency, the necessary capacity being provided by C_{57}, C_{55}, C_{65} and C_{64}. The necessary tuning to secure resonance is achieved through the use of movable iron cores in the same manner as in transformer L_{28}. The cathode bias for the first intermediate frequency tube is obtained through resistor R_{19} and the same voltage divider system as the first and second radio frequency tubes. The cathode bias for the second intermediate frequency tube is obtained through resistor R_{24}. The grid return of the second intermediate frequency tube is through resistor R_{23}, which provides means for introducing AVC voltage, and with capacitor C_{56} prevents radio frequency from feeding into the AVC circuit. The screen voltage of these two tubes is obtained from the voltage dividers consisting of resistors R_{20} and R_{21}, and R_{25} and R_{26}. These screen grids are by-passed to ground by capacitors C_{60} and C_{69}, respectively. Capacitors C_{59} and C_{68} serve to by-pass the cathodes to ground.

g Second Detector

A duo-diode-triode is employed as a second detector, one diode circuit serving for purposes of demodulation, the other diode circuit providing for AVC action. The triode portion of the tube serves as the first audio-frequency amplifier. These two latter functions will be described in detail in Paragraphs which follow. The cathode and the detector diode plate (the lower plate in Figure 9) act as a half-wave rectifier so that any current flowing through resistors R_{49} and R_{34} is pulsating. Any portion of the drop across resistor R_{34} may be amplified as audio-frequency. Capacitors C_{71} and C_{72} are placed in the circuit as radio frequency by-pass across these resistors. Resistor R_{28} provides the proper cathode bias for this tube and is by-passed to ground by capacitor C_{73}.

h Audio Frequency Circuits

The triode portion of the detector tube serves as the amplifying tube for the first stage of audio-frequency. This tube receives its grid excitation through capacitor C_{81}. This excitation consists of the drop across the entire resistor R_{34} for MVC operation, the drop across the lower portion of R_{34} for AVC operation. R_{32} serves as a high-impedance d-c grid return for the tube. The output circuit of the first audio tube is coupled to the control grid of the second audio-frequency tube through capacitor C_{76}. The primary of transformer T_1 acts as an audio-frequency choke and also as the primary of the transformer for coupling to a secondary circuit containing jack J_1 into which phones may be plugged. Capacitor C_{74} in this circuit prevents audio-frequency feed-back into the power supply and completes the audio-frequency plate circuit for this tube. Resistor R_{33} serves as a high-impedance d-c grid return for the second audio-frequency tube. The cathode bias of the second audio-frequency tube is provided by resistor R_{31}, in parallel with R_{54}; these resistors are by-

passed to ground by capacitor C_{98}. The output of the second audio-frequency tube is coupled through transformer T_2 to jack J_2, into which phones or loudspeaker may be plugged. Capacitor C_{80} in this plate circuit prevents audio-frequency feed-back into the power supply and completes the audio-frequency plate circuit.

i C-W Oscillator

A modified Hartley circuit is employed operating with the plate end of the tank circuit at ground potential for radio-frequency. The tank circuit of this oscillator consists of coil L_{31} tuned by capacitors C_{84} and C_{85} in parallel. C_{86} is a grid blocking capacitor and R_{43} is a grid-biasing resistor. The plate supply of this oscillator is obtained through switch SW_{11} (marked C.W.-OSC. OFF-ON on the front panel) permitting this oscillator to be turned on or off at will. Resistor R_{37}, in series with the d-c circuit, serves to drop the plate voltage from that supplied by the power unit to the correct value for this tube. The radio-frequency plate circuit is completed through capacitor C_{87} and ground to the tank circuit. A portion of the drop across tank coil L_{31} is impressed on the plate end of the second-detector tank circuit through a low-pass filter consisting of C_{96}, C_{97}, R_{51} and L_{32} and through coupling capacitor C_{41}. The purpose of this filter is to prevent the introduction of harmonics of the c-w oscillator frequency into the detector circuit of the receiver.

j Volume Control

(1) *MVC Action*

See Figures 9 and 11. When operating on manual volume control the cathodes of the first and second radio-frequency tubes and the first intermediate-frequency tube are returned to the voltage divider consisting of resistors R_{35} and R_{36}. This voltage divider is located between plus plate and ground, so that changing the value of R_{35} by operating the control on the front panel marked VOL changes this cathode bias and thus varies the gain of these tubes. Resistor R_{30} is shorted, preventing the AVC action described in Paragraph 9*j*(2). In this mode of operation that portion of the audio-frequency signal which appears across all of resistor R_{34} is available at the input of the first audio-frequency tube.

(2) *AVC Action*

See Figures 9 and 12. For AVC operation resistor R_{35} is short circuited to ground. The audio-frequency voltage available at the grid of the first audio-frequency tube is now the voltage across that portion of R_{34} between ground and the sliding contact. Changing the value of R_{34} by operation of the control marked VOL on the front panel changes the amount of audio-frequency voltage impressed on the first audio-frequency tube without interfering with AVC operation. The second diode plate of the second detector tube is coupled to the plate tank circuit of the second intermediate-frequency stage through capacitor C_{67} to generate the AVC supply voltage. The second detector cathode is maintained at a positive potential with respect to the AVC plate by d-c plate current in the triode section of the tube flowing through resistor R_{28}. Rectification will take place in this AVC circuit when the peak value of the a-c voltage impressed is greater than the d-c drop across R_{28} and this rectified voltage will appear across resistor R_{30}. The magnitude of the voltage across R_{30} is therefore dependent upon the strength of the signal received in excess of the drop across R_{28}. Thus, no AVC action is obtained on signals whose a-c peak value is less than the drop across R_{28}. This type of action is referred to as *delayed* AVC. In AVC operation the control grids of the first r-f, second r-f, mixer, first i-f and second i-f are returned to ground through R_{30}. A change in the voltage across R_{30} therefore affects the bias and gain of these tubes. The circuit is so arranged as to bias these tubes more negative on a strong signal, thus reducing their gain and tending to maintain a constant input to the detector.

k Tube Heater Circuits

Metal tubes of the heater type are employed in these radio receivers. These tubes require a heater voltage of approximately six volts per tube. To permit operation on a 12-14

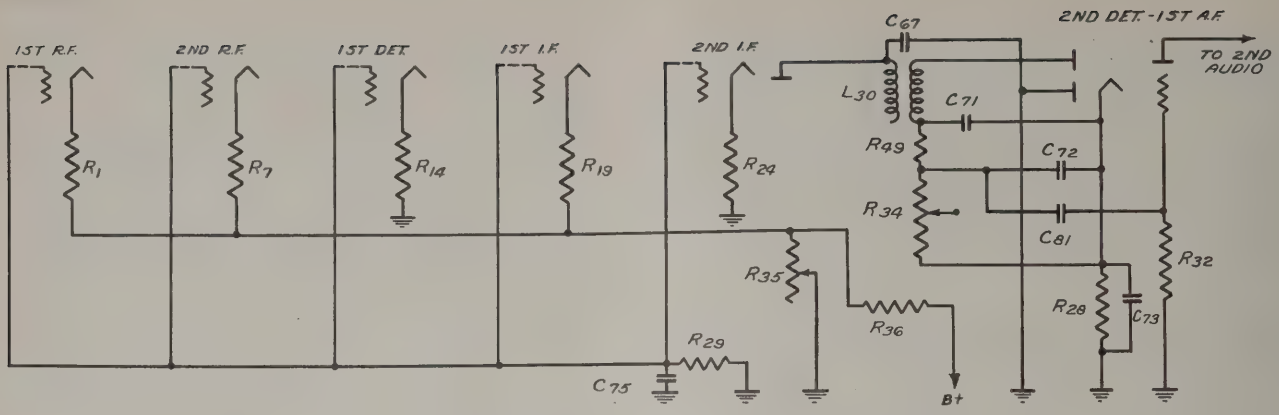


FIGURE 11—MANUAL VOLUME CONTROL CIRCUITS

volt power supply system, these tubes are connected in a series parallel combination, with two tubes which require the same heater current connected in series, and then these pairs arranged in parallel. Actual heater connections are as follows: The first detector (mixer) and second r-f tubes are in series, the first r-f and the r-f oscillator are in series, and the first and second i-f amplifiers are in series. Due to the difference in heater requirements the remaining tubes are connected in the following manner: the second detector and the c-w oscillator and resistor R_{17} are in parallel and the audio-frequency amplifier tube (VT-66) is in series with this combination. The heater connections are shown on the schematic diagrams, Figures 28 and 29.

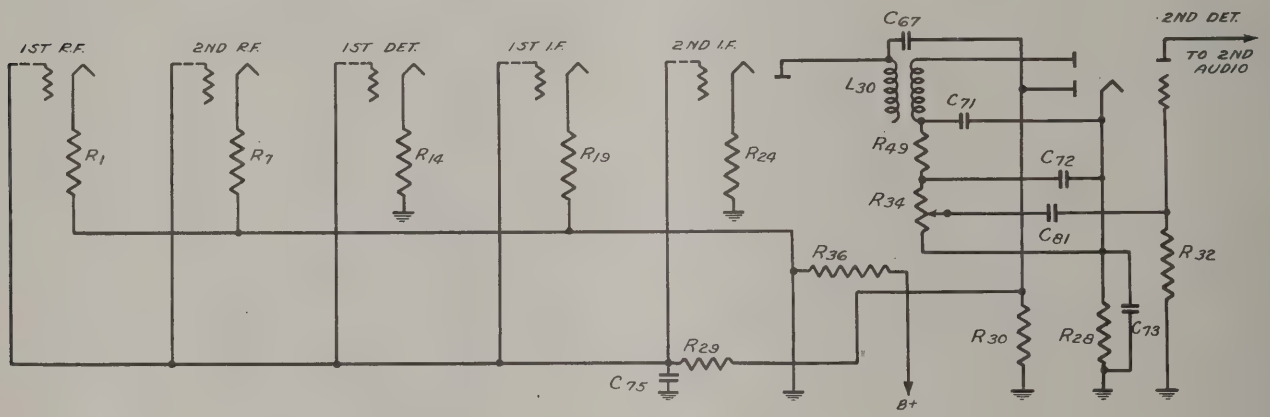


FIGURE 12—AUTOMATIC VOLUME CONTROL CIRCUITS

l Dial Lamp Circuit

Two dial Lamps LM-27 are connected in series across the heater circuit in such a manner as to receive current through the LAMPS fuse and be turned on and off by the OFF-MVC-AVC switch. These connections are shown on the schematic diagrams, Figures 28 and 29.

m Power Supply

(1) *Dynamotor DM-21-J*—See Figures 7 and 13.

This power supply unit, operating on an input voltage of 12-14 volts, produces the necessary plate voltage for Radio Receiver BC-312-J. This dynamotor is attached to hinge type mountings located on the rear of the receiver panel beneath the chassis shelf. The unit may readily be swung to one side to provide access to the underside of the shelf. Under full-load conditions the dynamotor requires 2.7 amperes at 14 volts, with an output of approximately 82 milliamperes at 230 volts. L_1 and C_1 constitute a filter circuit to prevent

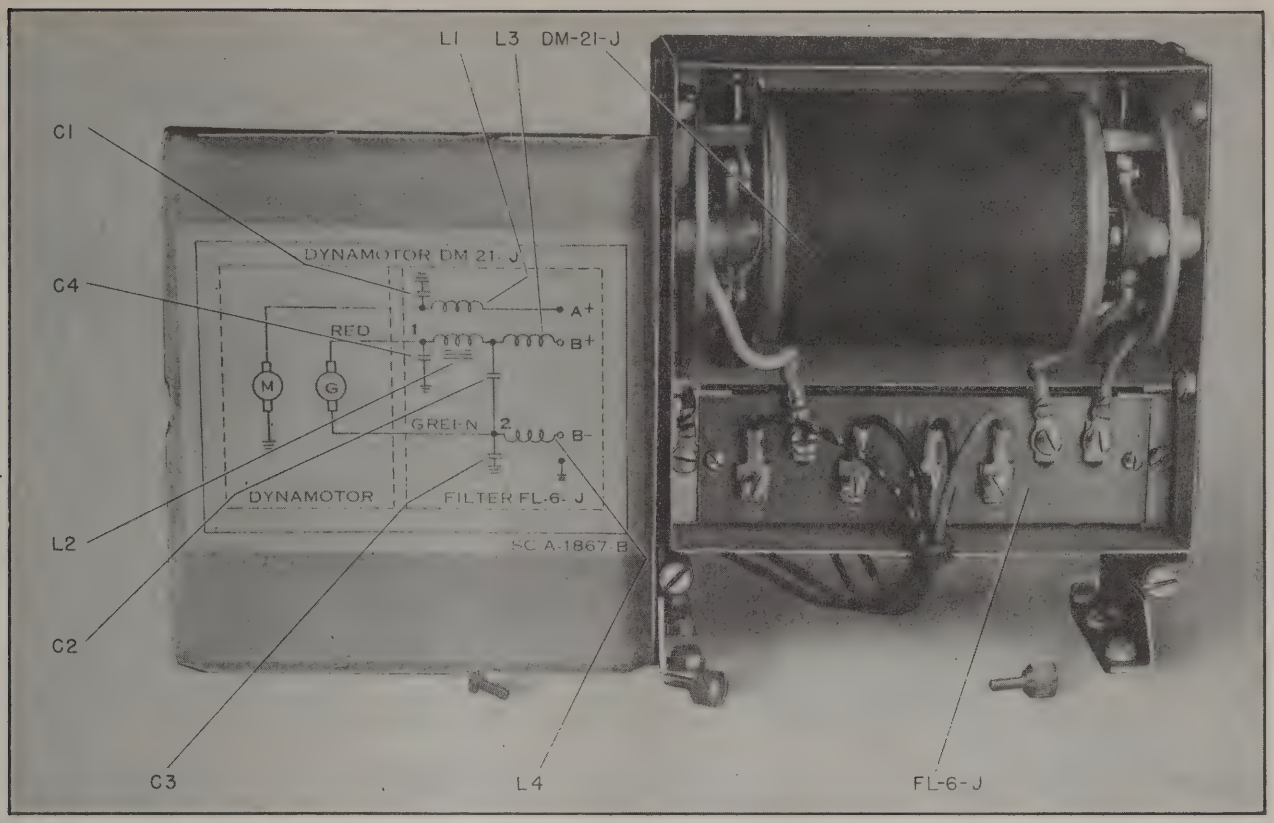


FIGURE 13—DYNAMOTOR DM-21-J,
BOTTOM VIEW, COVER REMOVED

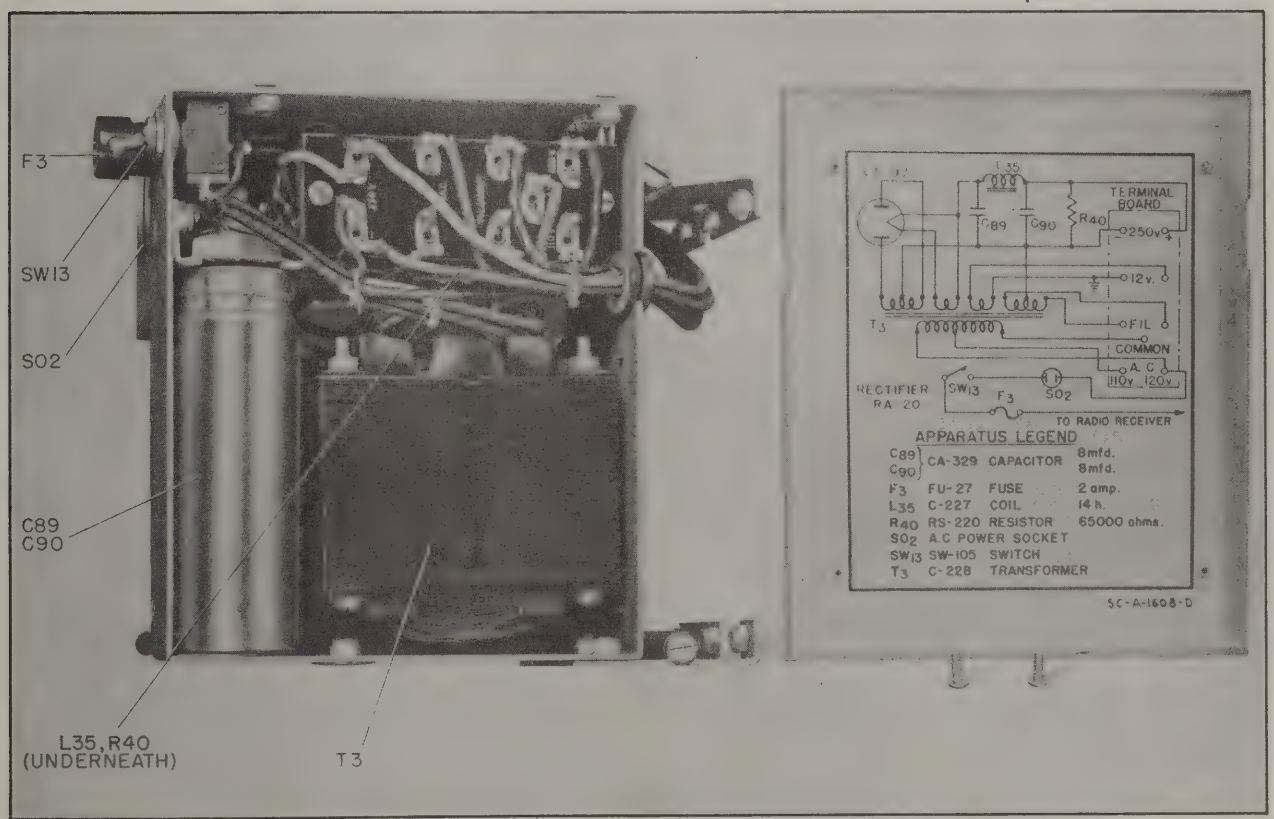


FIGURE 14—RECTIFIER RA-20,
BOTTOM VIEW, COVER REMOVED

radiation of r-f interference into the low-voltage supply circuit, L_2, L_3 and L_4, together with C_2, C_3 and C_4 constitute a combination audio-frequency and r-f filter circuit which reduces a commutator ripple to a value which will not be objectionable and also prevents r-f interference being transmitted by the dynamotor to the receiver circuits.

(2) *Rectifier RA-20*—See Figures 6 and 14. This power supply unit, operating from 110-120 volt, 60 cycle supply lines, provides all plate and filament voltages required to operate Radio Receiver BC-342-J. The location and method of attaching this unit to the receiver chassis is the same as that employed for Dynamotor DM-21-J. [See Paragraph 9*m*(1).] The output of the rectifier tube VT-97 is fed to the plate circuits of the receiver through a smoothing filter comprised of the iron core choke coil L_{35} and the double section electrolytic capacitor C_{89}, C_{90} together with the bleeder resistor R_{40}.

SECTION IV
MAINTENANCE

10 SERVICE

a Daily Inspection

Give the various components of Radio Receivers BC-312-J and BC-342-J a thorough inspection before each day's operation and at the end of the day when returning the receiver to storage. Making such inspections properly will insure that the equipment is left in operating condition at the end of the day so as to be ready for use at any time. This inspection should include examination of all cordage to see that it is securely fastened and has not been damaged. All accessible components should be examined and, if dirty, should be cleaned. At the end of a long period of storage, see that the dynamotor armature revolves freely.

b Lubrication

(1) *Receiver*

The various gears and bearings of the receiver chassis are lubricated at the time of manufacture with sufficient lubricant to last the life of the equipment. Unless operated in an abnormal manner, they should never require lubrication. In the event that such lubrication becomes necessary petrolatum may be used sparingly.

(2) *Dynamotor*

The bearings of Dynamotor DM-21-J are of the sealed, ball-bearing type, packed with grease at the time of manufacture. They will require one drop of light lubricating oil on each bearing at the end of every 500 hours of operation. More oil will do more harm than good. The dynamotor commutator should be kept clean and free from carbon, dust and grease.

c Miscellaneous

All plugs and sockets should be completely engaged and those of the screw type should be screwed down tightly (but not forced). All tubes should be inserted all the way into their corresponding sockets and the grid-cap connections firmly made. The chassis should be effectively locked into the cabinet in the prescribed manner.

11 LOCATING TROUBLE

a In searching for trouble in radio equipment a logical plan should be followed. Investigate possible causes of trouble in the order of likelihood of occurrence. First determine if the trouble is inside or outside the unit. The trouble, if external to the unit, will probably be a run-down battery, cords not properly connected, open or shorted conductors within a cord, open sockets or defective sockets. The trouble, if within the unit, will most frequently be a blown-out fuse, a loose or defective vacuum tube or a defective power supply assembly.

	Symptom	*Causes*
(1)	No filament voltage	Poor battery or defective power supply assembly Open power lead Short-circuited power lead Poor plug contact Burned-out fuse Burned-out tube filament Damaged by-pass capacitor Loose connection inside of the receiver

All of these causes, except the last three, should be checked before removing the receiver chassis from the cabinet.

(2)	No plate voltage	Poor battery Open or shorted power supply cord Poor plug contact Burned-out fuse Defective power supply assembly Loose connection inside the receiver Shorted by-pass capacitor Open resistor

The first four of these causes should be checked before removing the receiver chassis from the cabinet.

(3)	No audio frequency output	Headset plug not completely inserted in jack Defective headset, headset plug or headset cord *Defective tube

*The tubes may be checked with Test Set I-56-( ).

Symptom	*Causes*
	Loose connections inside of the receiver
	Damaged capacitor
	Damaged resistor
	Defective jack insulation
	Breakdown on r-f coils, leads or switches
	Defective band-change switch

The first two causes of trouble should be checked before removing the receiver chassis from the cabinet. The last two causes will be indicated by no signal audio output but there will usually be some audio *noise* output.

(4)	No change in intensity of noise level when SEND REC switch is operated	Antenna relay inoperative
(5)	Erratic noise in receiver	Defective headset or headset cord
		Defective power supply assembly
		Antenna relay chattering
		Dust or dirt in the receiver
		A loose connection in the receiver
		Defective capacitor or resistor in receiver

The first possible cause of trouble should be checked before removing the receiver chassis from the cabinet.

12 WIRE COLOR CODE

All of the connections within these receivers have been made with color-coded leads or with bus wire. The coloring of any lead is an indication of its destination as shown in Table 1.

TABLE 1

Wire	Destination
Green	Control Grid
Maroon	Screen Grid
Blue	Plate
Brown	Cathode
Red	Plate Supply Voltage
Yellow	AVC
Black, White tracer	Heaters (positive 14 volts)
Black	Ground Heaters (negative 14 volts)

13 TYPICAL VOLTAGE AND RESISTANCE MEASUREMENTS

a Typical operating voltages and currents for Radio Receiver BC-312-J are shown in Table 2. The point-to-point resistances within this receiver are shown in Table 3.

b Typical operating voltages and currents for Radio Receiver BC-342-J are shown in Table 4, and the point-to-point resistances within this receiver are shown in Table 5.

c Figure 15 is a tube socket voltage diagram in which the tube sockets are shown in their relative position as viewed from the top of the receiver chassis. Each socket is oriented with respect to its actual position.

d The values indicated are those which may be expected when Test Set I-56-( ) is used to check the receiver.

14 REPAIR

a Precautions

Be careful when servicing this radio equipment. Servicing should be attempted only by competent personnel. It is possible for an inexperienced operator attempting to locate and repair a minor trouble which a competent service man could care for in a very few moments, to damage this equipment to such an extent as to require that it be shipped to a depot for repair. **ONLY AUTHORIZED PERSONNEL SHOULD ATTEMPT TO REPAIR THIS EQUIPMENT EXCEPT UNDER CONDITIONS OF EXTREME EMERGENCY.**

b Dynamotor Power Supply

If the dynamotor power supply assembly has been determined to be defective it should be removed. Normally the replacement of brushes, turning down of commutators, freeing of bearings and all repairing of defective dynamotor power supply assemblies will be done at Signal Corps repair shops or Signal Corps Radio Sections at Air Depots. If the dynamotor power supply assembly cannot be replaced, or where an emergency requires it, local repairs are allowable. However, careful sanding-in of new brushes to fit the commutator, proper spring adjustment and a running-in period are necessary to insure quiet receiver operation. If results following local replacement of brushes are not satisfactory, return to a depot for overhaul should

TABLE II

TYPICAL OPERATING VOLTAGE AND CURRENT

RADIO RECEIVER BC-312-J

SUPPLY 14 VOLTS D.C. - MVC OPERATION - C-W OSC. OFF - VOLUME CONTROL MAXIMUM

Stage	Tube Type	Freq. (kc)	Plate Volts E_p	Screen Volts E_{g2}	Cathode Volts E_k	Heater Volts E_f (d.c.)	Plate Current I_p (ma)	Screen Current I_{g2} (ma)
1ST R.F.	VT-86		227	100	3.8	6.7	5.5	1.6
2ND R.F.	VT-86		227	97	4.1	6.7	5.8	1.8
1ST DET.	VT-87		227	106	3.6	6.7	4.9	6.2
R-F OSC.	VT-65	1500	96		30.5	6.6	4.4	
		3000						
		3000	91		24.5		4.6	
		5000						
		5000	84		15.5		4.8	
		8000						
		8000						
		18000	73		0.0		5.2	
1ST I.F.	VT-86		227	100	4.0	6.6	5.4	1.5
2ND I.F.	VT-86		227	103	3.8	6.8	5.8	1.7
C-W OSC.	VT-65		0.0*		0.0	6.5	0.0**	
2ND DET.	VT-88		0.6 Diode		6.3	6.5		
1ST A.F.			225				8.5	
AVC			0.0 Diode					
2ND A.F.	VT-66		220	235	20.5	6.8	17.5	3.2

* C-W OSC. ON E = 35.0

** C-W OSC. ON I = 1.9

TABLE III

TERMINAL TO GROUND RESISTANCE

RADIO RECEIVER BC-312-J

POWER SOURCE DISCONNECTED - VOLUME CONTROL MAXIMUM

Stage	Tube Type	Band Change Switch Position	TUBE SOCKET TERMINALS				
			Cathode	Plate	Screen	Grid MVC	Grid AVC
1ST R.F.	VT-86		500	16,200	28,500	2.1 meg.	3.0 meg.
2ND R.F.	VT-86		500	16,500	30,000	2.2 meg.	3.0 meg.
1ST DET.	VT-87		320	16,500	21,500	2.1 meg.	3.0 meg.
R-F OSC.	VT-65	1500 3000	7000	46,000		38,000	38,000
		3000 5000	5200			36,200	36,200
		5000 8000	3100			33,100	33,100
		8000 18000	0.0			31,000	31,000
1ST I.F.	VT-86		520	16,200	29,000	330,000	1.25 meg.
2ND I.F.	VT-86		490	16,200	30,000	330,000	1.25 meg.
C-W OSC.	VT-65		5.2	Open *		220,000	220,000
2ND DET.	VT-88			950,000 Diode			
1ST A.F.			720	16,200		270,000	270,000
AVC				0.0 Diode			
2ND A.F.	VT-66		1000	16,000	15,500	48,000	48,000

* *127,000 ohms with C-W OSC. ON*

TABLE IV

TYPICAL OPERATING VOLTAGE AND CURRENT

RADIO RECEIVER BC-342-J

MVC OPERATION - C.W. OSC. OFF

SUPPLY VOLTAGE: 120 VOLTS, 60 CYCLES - VOLUME CONTROL MAXIMUM

Stage	Tube Type	Freq.	Plate Volts E_p	Screen Volts E_{g2}	Cathode Volts E_k	Heater Volts E_f (a.c.)	Plate Current I_p	Screen Current I_{g2}
1ST R.F.	VT-86		252	112	4.2	6.2	6.1	1.6
2ND R.F.	VT-86		252	113	4.2	6.1	6.3	1.6
1ST DET.	VT-87		250	125	4.2	6.1	5.4	6.7
R-F OSC.	VT-65	1500 3000	107		33.0	6.1	4.5	
		3000 5000	98		23.0		4.7	
		5000 8000	92		14.5		4.9	
		8000 18000	82		0.0		5.2	
1ST I.F.	VT-86		250	110	4.3	6.2	6.5	1.8
2ND I.F.	VT-86		250	115	4.0	6.1	6.2	1.7
C-W OSC.	VT-65		0.0*		0.0	6.1	0.0**	
2ND DET.	VT-88		0.7 Diode					
1ST A.F.			250		7.8	6.1	11.0	
AVC			0.0 Diode					
2ND A.F.	VT-66		245	258	22.0	6.2	19.0	3.5
RECTIFIER	VT-97		295***			4.8	Plate #1 44.0 Plate #2 52.0	

* *C-W OSC. ON E = 45.0*

** *C-W OSC. ON I = 2.5*

*** *Read on 500 volt a-c scale*

TABLE V

TERMINAL TO GROUND RESISTANCE

RADIO RECEIVER BC-342-J

POWER SOURCE DISCONNECTED - VOLUME CONTROL MAXIMUM

Stage	Tube	Band Change Switch Position	TUBE SOCKET TERMINALS				
			Cathode	Plate	Screen	Grid MVC	Grid AVC
1ST R.F.	VT-86		500	13,500	28,000	2.2 meg.	3.2 meg.
2ND R.F.	VT-86		500	13,500	28,000	2.2 meg.	3.2 meg.
1ST DET.	VT-87		350	13,500	20,000	2.2 meg.	3.2 meg.
R-F OSC.	VT-65	1500 3000	7200	45,000		37,200	37,200
		3000 5000	4700			35,000	35,000
		5000 8000	2600			32,600	32,600
		8000 18000	0.0			30,000	30,000
1ST I.F.	VT-86		500	13,500	28,500	350,000	1.3 meg.
2ND I.F.	VT-86		500	13,500	29,000	340,000	1.3 meg.
C-W OSC.	VT-65		5.8	Open*		220,000	220,000
2ND DET.	VT-88		720	1 meg. Diode			
1ST A.F.				13,200		250,000	
AVC				0.0 Diode			
2ND A.F.	VT-66		1000	13,200	12,500	49,000	49,000
RECTIFIER	VT-97			Plate #1 75			
				Plate #2 75			

* *115,000 ohms with C-W OSC. ON*

be made at a time when the equipment can be best spared. Commutators which are not unduly worn may be cleaned using a fine grade of sandpaper and wiping off thoroughly with a cloth containing carbon tetrachloride. If the bearings are not damaged but merely need freeing, a few drops of light oil should be applied. If the trouble is due to an open or short-circuited winding, grooved commutators, or some other serious defect, the dynamotor power assembly should be replaced.

c Removing the Power Supply Assembly

The power supply assembly may be removed from the receiver chassis in the following manner:

(1) Remove the two screws which pass through the chassis shelf into the power assembly supporting struts.

(2) Turn the receiver chassis upside down.

(3) Remove the screw-pin from the inner hinge and swing the power supply assembly away from the panel.

(4) Disconnect the leads which connect the power supply assembly to the terminal board (TB-6). Before the leads are removed from the terminal board they should be tagged, thus insuring correct replacement.

(5) Complete the removal of the power supply assembly by removing the remaining screw type hinge-pin.

d Removing the R-F Oscillator Tuning Unit

The r-f oscillator tuning unit may be removed from the receiver chassis in the following manner:

(1) Rotate the BAND CHANGE switch to the 1,500-3,000 kc band.

(2) Remove the r-f oscillator compartment cover (21 screws).

(3) Remove the shaft-locking set-screw. This set-screw extends through the shaft between the 1st r-f and the r-f oscillator tuning units.

(4) Remove the shaft by pulling it out through the r-f oscillator tuning unit.

(5) Unsolder and remove the four leads which are attached to the top of the terminal board located in the upper rear corner of the r-f oscillator tuning unit.

(6) Remove the four flat-head machine-screws which attach the r-f oscillator tuning unit to the receiver chassis. These screws are located on the bottom of the chassis.

e Removing the 1st R-F Tuning Unit

The 1st r-f tuning unit may be removed from the receiver chassis in the following manner:

(1) Rotate the BAND CHANGE switch to the 1,500-3,000 kc band.

(2) Remove the back cover plate tube shelf shield.

(3) Remove the shaft-locking set-screw.

(4) Remove the shaft.

(5) Remove the tube-shelf mounting screws and drop the tube shelf to the rear of the receiver chassis.

(6) Unsolder and remove the grid, ground, and tuning capacitor leads from the terminals which protrude through the chassis shelf over the 1st r-f tuning unit. Unsolder and remove the brown leads from the terminal on the right-hand side (as viewed from the rear) of C_{26}, then unsolder the yellow (AVC) lead from the terminal on the rear of the tuning unit near the chassis shelf.

(7) Complete the removal of the tuning unit by removing the four flat-head machine screws which hold it to the receiver chassis.

f Removing the 2nd R-F or 1st Detector Tuning Unit

To remove either of these tuning units proceed as described in Paragraph 14*e*, except (6): unsolder and remove the grid, ground, and tuning capacitor leads from the terminals which protrude through the chassis shelf above the tuning unit which is to be removed. The blue lead which is attached to the tube socket for the stage in question and both leads which are connected to the terminals on the rear of the particular unit must be disconnected to permit removal of the tuning unit.

15 SENSITIVITY

a These receivers have been carefully adjusted and aligned by the manufacturer before shipment and should maintain these adjustments over reasonably long periods of time. Major

adjustments and repairs should be made only in an authorized repair shop equipped with the necessary servicing tools and equipment and by competent personnel. To determine if the set is correctly aligned the sensitivity should be checked at the 18 frequencies listed in Table 7, page 31.

b Before attempting to realign the r-f circuits of these receivers it should be definitely established that such realignment is necessary. The best way to determine this is to check the sensitivity of the receiver.

c The normal sensitivity of these receivers is better than three microvolts when measured under the following conditions:

OFF-MVC-AVC switch set at..... MVC
Power Supply:
BC-312-J..... 14 volts d.c.
BC-342-J.....120 volts, 60 cycles a.c.
C.W.-OSC. switch .....ON
CRYSTAL PHASING control set at...OUT
Output Load....4,000 ohms, non-inductive

Pure C.W. input from signal generator applied to antenna terminal through a 50 μμf dummy antenna; Volume Control set to produce 2.5 milliwatts noise output with no signal.

d THIS SENSITIVITY WILL, OF COURSE, BE SUBJECT TO VARIATIONS DUE TO TUBE AGING, THEREFORE, IT IS RECOMMENDED THAT NO ATTEMPT BE MADE TO REALIGN THE CIRCUITS OF THE RECEIVER UNLESS THE SENSITIVITY IS FOUND TO BE WORSE THAN TEN MICROVOLTS WITH NEW, AVERAGE TUBES.

16 SENSITIVITY MEASUREMENT

a Test Conditions

Output..... 10 milliwatts
Load Resistance.....4,000 ohms
Signal Frequency..... as noted in Table 6
Modulation Frequency.....400 cycles
Modulation.....30 per cent
Dummy Antenna.....50 μμf
Volume Control Set at..... maximum
Operation..... MVC-C.W. OSC. OFF
Power Source:
BC-312-J..... 14 volts, d.c.
BC-342-J.....120 volts, d.c.
Audio Test Frequency..... 400 cycles

b Procedure

(1) Connect the signal generator output to the antenna terminal on the receiver through the 50 μμf dummy antenna and connect a calibrated output meter having an impedance of 4,000 ohms across the PHONES 2ND AUDIO jack (J_2).

(2) Tune both the signal generator and the receiver to 3,000 kc and adjust the ALIGN INPUT control (C_{26}) to the point at which maximum output is obtained from the receiver. The setting of the ALIGN INPUT control should not be changed during subsequent measurements.

(3) Tune both the signal generator and the receiver to 1,500 kc, set the receiver VOL. control at maximum and, with-without changing the position of the input lead, note the input required to produce an output of 10 milliwatts from the receiver. (In the simplified checks for sensitivity and comparative stage gains which follow, signal-to-noise ratio has not been considered.)

(4) Replace the dummy antenna by a 0.1 μf capacitor and, without changing the tuning of either the signal generator or the receiver, inject the signal successively into the grids of the first r-f, second r-f and first detector tubes. Note the input required at each stage to produce an output of 10 milliwatts.

(5) Tune the signal generator to 470 kc and inject this signal successively into the grids of the first detector, first i-f and second i-f tubes noting in each case the input required to produce an output of 10 milliwatts.

(6) Remove the r-f signal generator, then connect a 400 cycle generator to the a-f volume control, R_{34} (yellow lead), through a 0.1 μf capacitor. Adjust the output of the a-f signal generator to the point at which the output of the receiver is 10 milliwatts. Note the output of the a-f signal generator.

(7) Remove the 400 cycle signal generator connection from the a-f volume control and, after swinging the power supply unit to one side, inject the 400 cycle signal into the grid (terminal 5) of the second a-f tube (VT-66). Note the output required from the signal generator

to produce an output of 10 milliwatts from the receiver.

c Input Requirements

The approximate input requirement for each stage of the receiver is given in Table 6.

TABLE 6
APPROXIMATE INPUT REQUIREMENTS

Frequency	Test Point	Microvolts
1,500 kc	ANTENNA TERMINAL	5.0
1,500 kc	1ST R-F GRID	12.0
1,500 kc	2ND R-F GRID	40.0
1,500 kc	1ST DET. GRID	115.0
470 kc	1ST DET. GRID	76.0
470 kc	1ST I-F GRID	480.0
470 kc	2ND I-F GRID	130,000.0
400 cycles	1ST A-F GRID	61,000
400 cycles	2ND A-F GRID	525,000

17 ALIGNMENT PROCEDURE

a **WHEN ALIGNING THE I.F. AND R.F. CIRCUITS OF THE RECEIVER, THE OUTPUT OF THE TEST OSCILLATOR SHOULD BE HELD TO THE MINIMUM VALUE THAT WILL PRODUCE A SATISFACTORY INDICATION ON AN OUTPUT METER CONNECTED TO THE PHONES 2ND AUDIO JACK IN THE RECEIVER. A CAPACITOR OF AT LEAST 0.1 μF SHOULD BE CONNECTED IN SERIES WITH THE TEST OSCILLATOR OUTPUT LEAD TO PREVENT SHORT CIRCUITING THE GRID BIAS ON THE I-F AMPLIFIER STAGES. THE OUTPUT LEAD FROM THE TEST OSCILLATOR SHOULD BE PREFERABLY A CONCENTRIC SHIELDED CABLE OF LOW CAPACITANCE AND THE CONNECTIONS OF THE GRIDS OF THE VARIOUS I-F STAGE TUBES SHOULD BE AS SHORT AS POSSIBLE. CARE SHOULD BE USED TO PREVENT THE TEST OSCILLATOR OUTPUT LEAD FROM COUPLING TO GRIDS OTHER THAN THE ONE TO WHICH IT IS CONNECTED.**

b I-F Stages

(1) Remove the receiver chassis from the cabinet and stand it with the r-f oscillator end down. Remove the screw-pin from the inner hinge and swing the power supply assembly out from under the chassis shelf. Using a stick, block the power supply assembly in a position that will permit access to the i-f transformer core positioning screws. The location of these screws is indicated on Figure 16.

(2) Connect the external source of power to the power input receptacle on the receiver, then place the REC.-SEND switch in the REC position; the OFF-MVC-AVC switch in the MVC position; the CW-OSC. switch in the OFF position, and the CRYSTAL PHASING control in the OUT position.

(3) Couple a modulated test oscillator, tuned to 470 kc, to the grid of the second i-f tube (VT-86) and adjust the position of the iron cores in the second i-f transformer (L_{30}) to obtain resonance at 470 kc. Due to the fact that this transformer is slightly overcoupled two points of maximum output, one a few kilocycles above, the other a few kilocycles below 470 kc, will be noted as the frequency of the test oscillator is varied. The correct adjustment of this transformer is that at which the same output is obtained at each of the two peaks when the frequency midway between them is 470 kc.

(4) After the second i-f transformer has been adjusted for maximum response, reduce the output of the test oscillator and change the position of the test lead to the grid of the first i-f tube (VT-86). Now adjust the position of the iron cores in the first i-f transformer (L_{29}) to the point at which the greatest output is obtained.

(5) When the tuning of the first i-f transformer has been completed, reduce the output of the test oscillator and connect the test lead to the grid of the first detector tube (VT-87). Now adjust the position of the iron cores in the first detector transformer to the point at which the greatest output is obtained.

c R-F Stages

(1) To obtain proper tracking of the receiver r-f stages it is necessary to align the r-f oscillator, first r-f, second r-f and first detector circuits at the *high* end of each band. The aligning controls for

each stage are located on the rear of the stage: those for the r-f oscillator stage may be reached by removing the screw-type plugs from the rear of the r-f oscillator stage shield; the others by removing the rear cover plate. On some bands two settings of the r-f oscillator alignment controls may be found which will produce maximum output from the receiver. One of these settings will produce a frequency which is 470 kc above and the other will produce a frequency which is 470 kc below the frequency of the incoming signal. On bands A, B, and C (1,500-8,000 kc) the heterodyne oscillator-frequency is 470 kc higher than the signal frequency. On bands D, E, and F, the heterodyne oscillator frequency is 470 kc lower than the incoming signal frequency. After the r-f circuits have been adjusted, a check of dial calibration at the lower end of each band will indicate whether or not the r-f oscillator adjustment is correct.

(2) Rotate the VOL control in a clockwise direction to its maximum position, operate the BAND CHANGE switch to the A band position (1,500-3,000 kc) and set the main tuning dial to 3.0. Tune the signal generator to 3,000 kc and couple its output to the grid of the first detector tube (VT-87). Now adjust the A control on the r-f oscillator tuning unit to the position at which the greatest output is obtained from the receiver, then tighten the control lock-nut.

(3) Without changing the frequency of the test oscillator, couple its output successively to the grid of the second r-f tube (VT-86), the grid of the first r-f tube (VT-86) and the antenna terminal. As the test oscillator output lead is shifted, the A control on the corresponding tuning unit should be adjusted and locked in the position at which the greatest output is obtained from the receiver.

(4) When the r-f stages have been adjusted for maximum response on the A band, the position of the BAND CHANGE switch should be successively changed to the B-C-D-E and F bands and the corresponding controls on the r-f tuning units adjusted and locked in the position at which the greatest output is obtained from the receiver.

(5) The output frequency of the test oscillator and the setting of the main tuning dial for each of the six bands is indicated in the following tabulation:

Band	Test Oscillator Frequency	Main Tuning Dial Setting
A	3,000 kc	3.0
B	5,000 kc	5.0
C	8,000 kc	8.0
D	11,000 kc	11.0
E	14,000 kc	14.0
F	18,000 kc	18.0

18 PERFORMANCE CHARACTERISTICS

Typical performance characteristics of these receivers are shown in Table 7.

TABLE 7

TYPICAL PERFORMANCE CHARACTERISTICS

BAND	FREQUENCY kc	CALIBRATION DEV. kc	CALIBRATION LIMIT kc±	NOISE MILLIWATTS Out	NOISE MILLIWATTS Limit	SENSITIVITY MICROVOLTS MVC CW	MVC XTAL	MVC LIMIT MVC	AVC MCW	AVC CW	AVC LIMIT AVC	STD. SEN. MVC	IMAGE MICROVOLTS MULTIPLY BY 1000 INPUT	RATIO	RATIO LIMIT
	1500	-5	15.0	1.0	12	1.70	6.0	10	5.2	1.3	7.5	6.0	2000.0	333.0	180.0
A	2200	-3	15.0	7.0	21	0.95	1.05	7	2.6	0.65	6.0	4.0	540.0	135.0	25.0
	3000	-5	15.0	12.0	30	0.54	0.5	6	1.6	0.42	6.0	2.8	80.0	28.6	7.5
	3000	-3	15.0	1.0	12				3.6	0.75	6.0	4.2	320.0	76.2	35.0
B	4000	-5	15.0	6.0	17				2.0	0.46	5.0	3.6	200.0	55.5	20.0
	5000	-5	15.0	10.0	22				1.5	0.38	4.0	2.4	54.0	22.5	7.5
	5000	-8	15.0	1.0	12				2.1	0.48	4.0	3.0	120.0	40.0	20.0
C	6500	-8	19.5	4.0	19				1.6	0.34	4.0	2.4	48.0	20.0	7.5
	8000	-5	24.0	6.0	26				1.3	0.28	4.0	2.0	14.0	7.0	2.5
	8000	-12	24.0	1.2	10				2.2	0.44	4.0	3.0	48.0	16.0	5.0
D	9500	-10	28.5	4.5	10				1.4	0.34	4.0	2.3	18.0	7.8	2.5
	11,000	-10	33.0	4.0	10				1.1	0.38	4.0	1.8	6.6	3.66	1.5
	11,000	-10	33.0	2.0	10				0.95	0.31	4.0	1.3	5.0	3.84	1.8
E	12,500	-15	37.5	3.5	10				0.80	0.28	4.0	1.3	4.0	3.1	0.75
	14,000	-10	42.0	4.0	10				0.70	0.30	4.0	1.15	1.8	1.56	0.475
	14,000	-15	42.0	0.5	10				1.6	0.56	4.0	2.1	4.0	1.91	0.475
F	16,000	-12	48.0	1.5	10				0.85	0.32	4.0	0.85	0.85	1.00	0.350
	18,000	-10	54.0	1.0	10				0.85	0.24	5.0	1.15	0.58	0.50	0.190

SELECTIVITY MVC - MCW

BAND WIDTH LIMITS	
MAX.	MIN.
20 kc	11 kc

MEASUREMENTS

FREQ. kc	BAND WIDTH kc
2000	14.5
4000	14.5
6000	15.0

CRYSTAL SELECTIVITY MVC-CW 2000 kc

INPUT	10X
Upper Frequency	1100 Cycles
Lower Frequency	350 Cycles
Band Width	750 Cycles
Band Width Limit	1400 Cycles

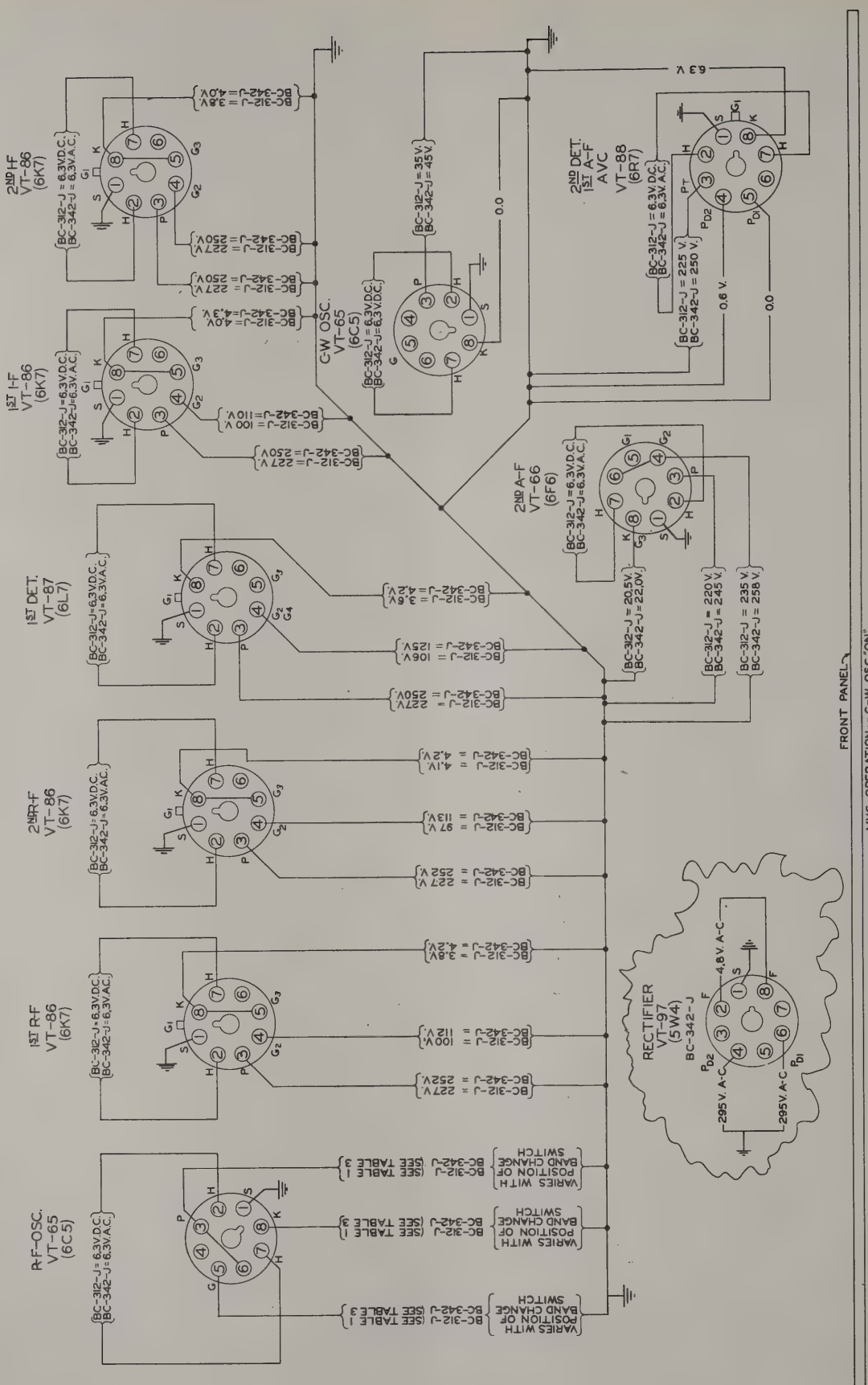


FIGURE 15—TUBE-SOCKET VOLTAGE DIAGRAM

TABLE OF REPLACEABLE PARTS

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
C_1		Capacitor CA-289	Variable air; 3-25 µµf, Hammarlund APC-25LN	Band-A Trimmer 1st R-F	SC-A-1728
C_2		Capacitor CA-291	Variable air; 6-100 µµf, Hammarlund APC-100LN	Band-B Trimmer 1st R-F	SC-A-1728
C_3		Capacitor CA-291	Same as C_2	Band-C Trimmer 1st R-F	SC-A-1728
C_4		Capacitor CA-290	Variable air; 4-50 µµf, Hammarlund APC-50LN	Band-D Trimmer 1st R-F	SC-A-1728
C_5		Capacitor CA-290	Same as C_4	Band-E Trimmer 1st R-F	SC-A-1728
C6		Capacitor CA-290	Same as C_4	Band-F Trimmer 1st R-F	SC-A-1728
C_7		Capacitor CA-289	Same as C_1	Band-A Trimmer 2nd R-F	SC-A-1728
C8		Capacitor CA-291	Same as C_2	Band-B Trimmer 2nd R-F	SC-A-1728
C_9		Capacitor CA-291	Same as C_2	Band-C Trimmer 2nd R-F	SC-A-1728
C_{10}		Capacitor CA-290	Same as C_4	Band-D Trimmer 2nd R-F	SC-A-1728
C_{11}		Capacitor CA-291	Same as C_4	Band-E Trimmer 2nd R-F	SC-A-1728
C_{12}		Capacitor CA-290	Same as C_4	Band-F Trimmer 2nd R-F	SC-A-1728
C_{13}		Capacitor CA-289	Same as C_1	Band-A Trimmer 1st Det.	SC-A-1728
C_{14}		Capacitor CA-291	Same as C_2	Band-B Trimmer 1st Det.	SC-A-1728
C_{15}		Capacitor CA-291	Same as C_2	Band-C Trimmer 1st Det.	SC-A-1728
C_{16}		Capacitor CA-290	Same as C_4	Band-D Trimmer 1st Det.	SC-A-1728

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
C_{17}		Capacitor CA-290	Same as C_4	Band-E Trimmer 1st Det.	SC-A-1728
C_{18}		Capacitor CA-290	Same as C_4	Band-F Trimmer 1st Det.	SC-A-1728
C_{19}		Capacitor CA-289	Same as C_1	Band-A Trimmer R-F Osc.	SC-A-1728
C_{20}		Capacitor CA-291	Same as C_2	Band-B Trimmer R-F Osc.	SC-A-1728
C_{21}		Capacitor CA-291	Same as C_2	Band-C Trimmer R-F Osc.	SC-A-1728
C_{22}		Capacitor CA-290	Same as C_4	Band-D Trimmer R-F Osc.	SC-A-1728
C_{23}		Capacitor CA-290	Same as C_4	Band-E Trimmer R-F Osc.	SC-A-1728
C_{24}		Capacitor CA-290	Same as C_4	Band-F Trimmer R-F Osc.	SC-A-1728
C_{25}		Capacitor CA-294	Fixed air; 125 µµf, ±1 µµf	Padder, 1st R-F	SC-D-2575
C_{26}		Capacitor CA-293	Variable air; 10-210 µµf, Hammarlund APC-210, special, shielded	Antenna Alignment	SC-A-2580
C_{27}		Capacitor CA-284	Molded, paper, 0.05 µf ±10%, 400 v, d-c working, Micamold Type 342	1st R-F By-pass	SC-D-1995
C_{28}	*	Capacitor	Variable air; ganged with C_{34}, C_{46} and C_{82}, 13-226 µµf	1st R-F Tuning	SC-D-2568
C_{29}		Capacitor CA-195	Fixed paper, 3 sections in metal case, each section 0.05 µf +14%, -6%, 200 v, d-c working, Aerovox special	1st R-F Cathode By-pass	SC-D-512
C_{30}				1st R-F Screen By-pass	
C_{31}				1st R-F "B" Supply By-pass	
C_{32}		Capacitor CA-284	Same as C_{27}	1st R-F Plate By-pass	SC-D-1995

* *C_{28}, C_{34}, C_{46} and C_{82} ganged comprise Capacitor CA-292*

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
C_{33}		Capacitor CA-266	Mica, 100 μμf +14% -6%, 250 v, d-c working Aerovox Type 1468	2nd R-F Grid Coupling	SC-D-1993
C_{34}	*	Capacitor	Variable air, ganged with C_{28}, C_{46} and C_{82} 13-226 μμf	2nd R-F Tuning	SC-D-2568
C_{35}		Capacitor CA-195	Same as C_{29}	2nd R-F Cathode By-pass	SC-D-512
C_{36}			C_{30}	2nd R-F Screen By-pass	
C_{37}			C_{31}	2nd R-F "B" Supply By-pass	
C_{38}		Capacitor CA-294	Same as C_{25}	Padder, 1st Det.	SC-D-2575
C_{39}		Capacitor CA-284	Same as C_{27}	2nd R-F Plate By-pass	SC-D-1995
C_{40}		Capacitor CA-294	Same as C_{25}	Padder, R-F Osc.	SC-D-2575
C_{41}		Capacitor CA-278	Mica, 5 μμf +14% -6%, 300 v, d-c working, Micamold Type GL	CW Osc. Coupling	SC-D-1993
C_{42}		Capacitor CA-300	Mica, aged, 3000 μμf ±2%, 250 v, d-c working, Aerovox Type 1467	Band-C Padder R-F Osc.	SC-D-1993
C_{43}		Capacitor CA-297	Mica, aged, 1600 μμf ±2%, 250 v, d-c working, Aerovox Type 1467	Band-B Padder R-F Osc.	SC-D-1993
C_{44}		Capacitor CA-299	Mica, aged, 750 μμf ±2%, 250 v, d-c working, Aerovox Type 1467	Band-A Padder R-F Osc.	SC-D-1993
C_{45}		Capacitor CA-266	Same as C_{33}	1st Det. Grid Coupling	SC-D-1993
C_{46}	*	Capacitor	Variable air, ganged with C_{28}, C_{34} and C_{82} 13-226 μμf	1st Det. Tuning	SC-D-2568
C_{47}		Capacitor CA-266	Same as C_{33}	R-F Osc. Coupling	SC-D-1993

* *C_{28}, C_{34}, and C_{82} ganged comprise Capacitor CA-292*

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
C48			C29	1st Det. Cathode By-pass	SC-D-512
C49		Capacitor CA-195	Same as C30	1st Det. Screen By-pass	
C50			C31	1st Det. "B" Supply By-pass	
C51		Capacitor CA-323	Variable air, extended shaft; 4.50 μμf, Hammarlund APC-50-S	Crystal Phasing	SC-A-1728
C52		Capacitor CA-342	Mica, aged, 100 μμf ±2%, 400 v, d-c working, Aerovox Type 1469	1st I-F Grid Coupling	SC-D-1993
C53		Capacitor CA-344	Mica, aged, 400 μμf ±2% 400 v, d-c working, Aerovox Type 1469	1st I-F Transformer-Primary Tuning	SC-D-1993
C54		Capacitor CA-371	Mica, 0.01 μf ±10%, 450 v, d-c working Aerovox Type 1461	1st Det. Plate By-pass	RL-D-6222
C55		Capacitor CA-344	Same as C53	2nd I-F Transformer-Sec. Tuning	SC-D-1993
C56		Capacitor CA-371	Same as C54	2nd I-F AVC By-pass	RL-D-6222
C57		Capacitor CA-344	Same as C53	2nd I-F Transformer-Primary Tuning	SC-D-1993
C58		Capacitor CA-371	Same as C54	1st I-F Plate By-pass	RL-D-6222
C59			Fixed, paper, 3 sections in metal case, each section 0.05 μf +14% -6%, 200 v, d-c working, Aerovox special	1st I-F Cathode By-pass	
C60		Capacitor CA-302		1st I-F Screen By-pass	
C61				1st I-F "B" Supply By-pass	
C62		Capacitor CA-284	Same as C27	1st Det. AVC By-pass	SC-D-1995
C63		Capacitor CA-371	Same as C54	1st I-F AVC By-pass	RL-D-6222

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
C64		Capacitor CA-342	Same as C52	2nd Det. Transformer, Sec. Tuning	SC-D-1993
C65		Capacitor CA-342	Same as C52	2nd I-F Plate	SC-D-1993
C66		Capacitor CA-371	Same as C54	2nd I-F Plate By-pass	RL-D-6222
C67		Capacitor CA-279	Mica, 10 μμf +14% -6%, 300 v, d-c working, Micamold Type GL	Diode AVC Coupling	SC-D-1993
C68		Capacitor CA-301	Fixed paper, 3 sections in metal case, each section 0.05 μf +14% -6%, 200 v, d-c working	2nd I-F Cathode By-pass	
C69				2nd I-F Screen By-pass	
C70				2nd I-F Plate By-pass	
C71		Capacitor CA-218	Mica, 150 μμf +14% -6%, 250 v, d-c working, Aerovox Type 1465	2nd Det. Output Filter	SC-D-1993
C72		Capacitor CA-193	Mica, 500 μμf +14% -6%, 250 v, d-c working, Aerovox Type 1465	2nd Det. Output Filter	SC-D-1993
C73			C68	2nd Det. Cathode By-pass	
C74		Capacitor CA-301	Same as C69	1st Audio "B" Supply By-pass	
C75			C70	AVC Filter Condenser	
C76		Capacitor CA-371	Same as C54	2nd Audio Grid Coupling	RL-D-6222
C77		Not Used			
C78			Fixed paper, 3 sections in metal case, each section 0.01 μf +14% -6%, Aerovox	Negative "A" Supply By-pass	
C79		Capacitor CA-276		Positive "A" Supply By-pass	SC-D-512
C80				2nd Audio "B" Supply By-pass	
C81		Capacitor CA-281	Fixed paper, 0.01 μf ±10%, 400 v, d-c working, Micamold Type 340	1st Audio Grid Coupling	SC-D-1995

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
C82	*	Capacitor	Variable air, ganged with C28, C34 and C46, 13-226 μμf	R-F Osc. Tuning	SC-D-2568
C83		Capacitor CA-277	Fixed paper, 0.1 μf ±10%, 400 v, d-c working, Micamold Type 345	R-F Osc. Plate By-pass	SC-D-1995
C84		Capacitor CA-383	Variable air, extended shaft; 1-10 μμf, Hammarlund Type APC-10-S	CW Oscillator Control	SC-A-1728
C85		Capacitor CA-253	Variable air, 4-75 μμf, Hammarlund Type APC-75	CW Oscillator Trimmer	SC-A-1728
C86		Capacitor CA-266	Same as C33	CW Oscillator Grid Coupling	SC-D-1993
C87		Capacitor CA-284	Same as C27	CW Oscillator Plate By-pass	SC-D-1995
C88		Capacitor CA-266	Same as C33	R-F Oscillator Grid Coupling	SC-D-1993
C89		Capacitor CA-329	Electrolytic, 2 sections in aluminum; can; each section 8 μf, 450 v, d-c working, Aerovox	"B" Power Supply Filter	SC-A-1490
C90		(**)		"B" Power Supply Filter	
C91		Not Used			
C92		Not Used			
C93		Not Used			
C94		Capacitor CA-298	Mica, aged, 800 μμf, ±2%, 250 v, d-c working, Aerovox Type 1467	1st I-F Transformer Tuning	SC-D-1993
C95		Capacitor CA-298	Same as C94	1st I-F Transformer Tuning	SC-D-1993
C96		Capacitor CA-286	Mica, 75 μμf +14% -6%, 250 v, d-c working, Aerovox Type 1468	CW Oscillator Output Filter	SC-D-1993
C97		Capacitor CA-286	Same as C96	CW Oscillator Output Filter	SC-D-1993

* *C28, C34 and C46 ganged comprise Capacitor CA-292*
(**) *Used on BC-342-J only.*

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
C_{98}		Capacitor CA-275	Fixed paper in metal case, 4 μf +14% -6%, 50 v, d.c. working, Aerovox	2nd Audio Cathode By-pass	SC-D-512
C_{99}		Capacitor CA-284	Same as C_{27}	2nd R-F AVC By-pass	SC-D-1995
C_{100}		Capacitor CA-294	Same as C_{25}	2nd R-F Padder	SC-D-2575
C_{101}		Capacitor CA-266	Same as C_{33}	1st R-F Grid Coupling	SC-D-1993
C_{102}		Capacitor CA-284	Same as C_{27}	1st R-F AVC By-pass	SC-D-1995
CX		Crystal DC-6-A	Quartz crystal in holder, 470 kc	Crystal Filter Unit	SC-D-2972
DM		Dynamotor DM-21-J	Includes filter FL-6-J in metal case, input 14 v, d-c , output 230 v at 90 ma, Pioneer Gen-e-motor	High Voltage Power Supply for BC-312-J	SC-D-2723
F_1		Fuse FU-21-A	Cartridge fuse, 10 amps. 25 v, Littlefuse Type High Lag, 3AG #1081-C	Dynamotor and Filament Circuits (†)	SC-D-2532
F_2		Fuse FU-21-A	Same as F_1	Dial Light Circuit	SC-D-2532
F_3		Fuse FU-27 (**)	Cartridge fuse, 2 amps. 250 v, Littlefuse Type 3AG, Cat. No. 1042	Primary Circuit of RA-20 Rectifier	SC-D-1610
FL		Filter FL-6-J	Case containing following units sealed in compound: 2 LV, R-F chokes, 1 HV, R-F choke, 1 A-F choke, 1 0.003 μf capacitor, 1 0.3 μf capacitor, 1 0.5 μf capacitor, 1 20 μf electrolytic capacitor, with d-c	Filter Circuit Component for Dynamotor DM-21-J	SC-D-1866

(†) *For BC-342-J Receiver this fuse protects filament circuit only.*
(**) *Used on BC-342-J only.*

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
			working voltages of 1000, 400, 200 and 450 respectively Pioneer Gen-e-motor Type D-201		
J1		Jack JK-34-A	Open circuit type	1st Audio Phones	Spec.71-852 SC-D-2339 less (8)
J2		Jack JK-34-A	Same as J1	2nd Audio Phones	Spec.71-852 SC-D-2339 less (8)
J3		Jack JK-33-A	3-circuit type	Speaker	Spec.71-852 SC-D-2332 less (5)
J4		Jack JK-33-A	Same as J3	Microphone	Spec.71-852 SC-D-2332 less (5)
J5		Jack JK-34-A	Same as J1	Key	Spec.71-852 SC-D-2339 less (8)
L1		Coil		Band-A, 1st R-F	SC-D-2556
L2		Coil		Band-B, 1st R-F	SC-D-2556
L3		Coil		Band-C, 1st R-F	SC-D-2556
L4		Coil		Band-D, 1st R-F	SC-D-2556
L5		Coil		Band-E, 1st R-F	SC-D-2556
L6		Coil		Band-F, 1st R-F	SC-D-2556
L7		Coil		Band-A, 2nd R-F	SC-D-2556
L8		Coil		Band-B, 2nd R-F	SC-D-2556

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
L_9		Coil		Band-C, 2nd R-F	SC-D-2556
L_{10}		Coil		Band-D, 2nd R-F	SC-D-2556
L_{11}		Coil		Band-E, 2nd R-F	SC-D-2556
L_{12}		Coil		Band-F, 2nd R-F	SC-D-2556
L_{13}		Coil		Band-A, 1st Det.	SC-D-2556
L_{14}		Coil		Band-B, 1st Det.	SC-D-2556
L_{15}		Coil		Band-C, 1st Det.	SC-D-2556
L_{16}		Coil		Band-D, 1st Det.	SC-D-2556
L_{17}		Coil		Band-E, 1st Det.	SC-D-2556
L_{18}		Coil		Band-F, 1st Det.	SC-D-2556
L_{19}		Coil		Band-A, R-F Osc.	SC-D-2556
L_{20}		Coil		Band-B, R-F Osc.	SC-D-2556
L_{21}		Coil		Band-C, R-F Osc.	SC-D-2556
L_{22}		Coil		Band-D, R-F Osc.	SC-D-2556
L_{23}		Coil		Band-E, R-F Osc.	SC-D-2556
L_{24}		Coil		Band-F, R-F Osc.	SC-D-2556
L_{25}		Not Used			

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
L_{26}		Not Used			
L_{27}		Not Used			
L_{28}		Transformer C-202		1st Detector	SC-D-4169
L_{29}		Transformer C-203		1st I-F	SC-D-4169
L_{30}		Transformer C-204		2nd I-F	SC-D-4169
L_{31}		Coil		CW Beat Oscillator	SC-D-2563
L_{32}		Coil		Filter, CW Oscillator	SC-D-2563
L_{33}		Not Used			
L_{34}		Not Used			
L_{35}		Coil C-227	Iron core, reactor, Chicago Transformer Co., special 14.5 mh ±10% at 800 cycles, 0.085 ma, d-c, 490 ohms ±10%	Filter circuit of RA-20 Rectifier (**)	SC-D-1483
LM_1		Neon Lamp	Neon lamp, General Electric Vapor Lamp Co., Code No. CD-1002-CL-125	Antenna Overload Protection	SC-A-1801
LM_2		Lamp LM-27	Mazda #44, 6.3 v, General Electric Co.	Dial Illumination	SC-D-2573
LM_3		Lamp LM-27	Same as LM_2	Dial Illumination	SC-D-2573
R_1		Resistor RS-164	Wire-wound, insulated, 500 ohms, 1 w, Micamold Type MWC	Cathode Bias, 1st R-F	SC-D-970
R_2		Resistor RS-169	Carbon, insulated, 60,000 ohms -10%, 1/2 w	1st R-F Screen Bleeder	SC-D-970

(**) *Used on BC-342-J only.*

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
R_3		Resistor RS-149	Carbon, insulated, 40,000 ohms ±10%, 1/2 w	1st R-F Screen Divider	SC-D-970
R_4		Resistor RS-172	Carbon, insulated, 100,000 ohms ±10%, 1/3 w, Allen-Bradley Type E	1st R-F AVC Filter	SC-D-970
R_5		Resistor RS-125	Carbon, insulated, 1000 ohms ±10%, 1/2 w	1st R-F "B" Supply Filter	SC-D-970
R6		Resistor RS-173	Carbon, insulated, 2 meg. ±10%, 1/3 w, Allen-Bradley Type E	2nd R-F Grid Input	SC-D-970
R7		Resistor RS-164	Same as R_1	Cathode Bias 2nd R-F	SC-D-970
R8		Resistor RS-169	Same as R_2	2nd R-F Screen Bleeder	SC-D-970
R9		Resistor RS-149	Same as R_3	2nd R-F Screen Divider	SC-D-970
R_{10}		Resistor RS-172	Same as R_4	2nd R-F AVC Filter	SC-D-970
R_{11}		Resistor RS-125	Same as R_5	2nd R-F "B" Supply Filter	SC-D-970
R_{12}		Resistor RS-173	Same as R6	1st Det. Grid Input	SC-D-970
R_{13}		Resistor RS-168	Carbon, insulated, 50,000 ohms ±10%, 1/3 w, Allen-Bradley Type E	1st Det. Injector Grid Input	SC-D-970
R_{14}		Resistor RS-166	Wire-wound, insulated, 350 ohms ±10%, 1 w, Micamold Type MWC	1st Det. Cathode Bias	SC-D-970
R_{15}		Resistor RS-140	Carbon, insulated, 30,000 ohms, 1/2 w	1st Det. Screen Divider	SC-D-970
R_{16}		Resistor RS-172	Same as R_4	1st Det. AVC Filter	SC-D-970
R_{17}		Resistor RS-125	Same as R_5	1st Det."B" Supply Filter	SC-D-970

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
R18		Resistor RS-172	Same as R4	1st I-F Grid Input	SC-D-970
R19		Resistor RS-164	Same as R1	1st I-F Cathode Bias	SC-D-970
R20		Resistor RS-163	Carbon, insulated, 60,000 ohms ±10%, 1 w, Stackpole	1st I-F Screen Bleeder	SC-D-970
R21		Resistor RS-149	Same as R3	1st I-F Screen Divider	SC-D-970
R22		Resistor RS-125	Same as R5	1st I-F "B" Supply Filter	SC-D-970
R23		Resistor RS-150	Carbon, insulated, 100,000 ohms ±10%, 1/2 w	2nd I-F AVC Filter	SC-D-970
R24		Resistor RS-164	Same as R1	2nd I-F Cathode Bias	SC-D-970
R25		Resistor RS-163	Same as R20	2nd I-F Screen Bleeder	SC-D-970
R26		Resistor RS-149	Same as R3	2nd I-F Screen Divider	SC-D-970
R27		Resistor RS-125	Same as R5	2nd I-F "B" Supply Filter	SC-D-970
R28		Resistor RS-171	Wire-wound, insulated, 750 ohms ±10%, 1 w, Micamold Type MWC	1st audio cathode bias	SC-D-970
R29		Resistor RS-162	Carbon, insulated, 250,000 ohms ±10%, 1/2 w	AVC Filter	SC-D-970
R30		Resistor RS-161	Carbon, insulated, 1 meg. ±10%, 1/3 w, Allen-Bradley Type E	Diode AVC Input	SC-D-970
R31		Resistor RS-223	Wire-wound, insulated, 2000 ohms ±10%, 1 w, Micamold Type MCW	2nd Audio Cathode Bias	SC-D-970
R32		Resistor RS-162	Same as R29	1st Audio Grid Input	SC-D-970

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
R_{33}		Resistor RS-131	Carbon, insulated, 50,000 ohms ±10%, 1/2 w	2nd Audio Grid Input	SC-D-970
R_{34} R_{35}		Potentiometer RS-174	Double unit, one 500,000 ohm section and one 50,000 ohm section	Volume Control	SC-D-1982
R_{36}		Resistor RS-111	Carbon, insulated, 100,000 ohms, 1 w, Stackpole	Cathode Bias Voltage Divider	SC-D-970
R_{37}		Resistor RS-150	Same as R_{23}	CW Oscillator Plate	SC-D-970
R_{38}		Resistor RS-169	Same as R_2	2nd I-F Transformer Shunt	SC-D-970
R_{39}		Not Used			
R_{40}		Resistor RS-220	Carbon, insulated, 65,000 ohms ±5%, 2 w, I.R.C. Type BT-2	Bleeder Resistor, RA-20 Rectifier (**)	SC-D-970
R_{41}		Resistor RS-139	Carbon, insulated, 30,000 ohms ±10%, 1 w, Stackpole	R-F Oscillator Plate	SC-D-970
R_{42}		Resistor RS-140	Same as R_{15}	R-F Oscillator Grid Leak	SC-D-970
R_{43}		Resistor RS-148	Carbon, insulated, 200,000 ohms ±10%, 1/2 w	CW Oscillator Grid Leak	SC-D-970
R_{44}		Resistor RS-235	Carbon, insulated, 3000 ohms ±10%, 1 w, Stackpole	R-F Oscillator Padder Shunt Band-C	SC-D-970
R_{45}		Resistor RS-237	Carbon, insulated, 5000 ohms ±10%, 1 w, Stackpole	R-F Oscillator Padder Shunt Band-B	SC-D-970
R_{46}		Resistor RS-238	Carbon, insulated, 7500 ohms ±10%, 1 w, Stackpole	R-F Oscillator Padder Shunt Band-A	SC-D-970

(**) Used on BC-342 J only.

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
R47		Resistor RS-176	Carbon, insulated, 60 ohms ±10%, 1/2 w	Filament Voltage Equalizer	SC-D-970
R48		Resistor RS-169	Same as R2	1st Det. Screen Bleeder	SC-D-970
R49		Resistor RS-133	Carbon, insulated, 500,000 ohms ±10%, 1/2 w	2nd Detector Diode Output	SC-D-970
R50		Resistor RS-140	Same as R15	1st Detector, Screen Divider	SC-D-970
R51		Resistor RS-129	Carbon, insulated, 10,000 ohms ±10%, 1/2 w,	CW Oscillator Output	SC-D-970
R52		Resistor RS-175	Carbon, insulated, 10,000 ohms ±10%, 1/3 w, Allen-Bradley Type E	1st I-F AVC Filter	SC-D-970
R53		Resistor RS-173	Same as R6	1st R-F Grid Input	SC-D-970
R54		Resistor RS-223	Same as R31	2nd Audio Cathode Bias	SC-D-970
RA		Rectifier RA-20	Operates from 115 v,a-c, 60 cycle source	Rectifier Power Supply for BC-342-J (**)	SC-D-1609
RL1		Relay BK-13	Double pole, single throw, contacts close when energized, operates from 12 v circuit, coil resistance 60 ohms	Send-Receive Relay	SC-D-1942
SO1		Socket SO-94	14-pole male connector with threaded shell, Breeze Corp. Part #E 1003-1-10	Connection to Power Source and Control Circuits	SC-D-2592
SW1		Switch SW-131	Toggle, S.P.S.T., Arrow-Hart & Hegeman #20992-Z	Send-Receive	SC-A-1042
SW2		Switch	Ceramic wafer, Centralab BAC 2302 B	Band Change, 1st R-F Stage	SC-D-4046 (Fig. 2)
SW3		Switch	Ceramic wafer, Centralab BAC 2302 B	Band Change, 1st R-F Stage	SC-D-4046 (Fig. 2)

(**) Used on BC-342-J only.

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
SW_4		Switch	Ceramic wafer, Centralab BAC-2302 B	Band Change, 2nd R-F Stage	SC-D-4046 (Fig. 2)
SW_5		Switch	Ceramic wafer, Centralab BAC 2302 B	Band Change, 2nd R-F Stage	SC-D-4046 (Fig. 2)
SW6		Switch	Ceramic wafer, Centralab BAC 2302 B	Band Change, 1st Detector Stage	SC-D-4046 (Fig. 2)
SW_7		Switch	Ceramic wafer, Centralab BAC 2302 B	Band Change, 1st Detector Stage	SC-D-4046 (Fig. 2)
SW8		Switch	Ceramic wafer, Centralab BAC 2302 B	Band Change, R-F Oscillator Stage	SC-D-4046 (Fig. 2)
SW_9		Switch	Ceramic wafer, Centralab BAC 2302 B	Band Change, R-F Oscillator Stage	SC-D-4046 (Fig. 2)
SW_{10}		Switch	Part of crystal phasing condenser assembly	Crystal Phasing	
SW_{11}		Switch SW-139	Toggle, S.P.S.T. Arrow-Hart & Hegeman #20992-BK	CW Oscillator Control	SC-A-1042
SW_{12}		Switch SW-119	2 section, 3 position rotary, Stackpole Carbon Co., special	OFF-MVC-AVC	SC-D-2574
SW-13		Switch SW-105	Toggle, S.P.S.T. Arrow-Hart & Hegeman #20994-BQ	AC Line Switch, RA-20 Rectifier (**)	SC-D-1042
T_1		Transformer C-205	Turns ratio, pri., 5000, sec., 2500	Audio Interstage	Spec. 71-399 SC-D-2567
T_2		Transformer C-160	Turns ratio, pri., 5000, sec., 1885	Audio Output	Spec. 71-932 SC-D-2569
T_3		Transformer C-228	Primary, 110-120 v, 60 cycles, H.V. winding 600 v, ±2%, c.t. 100 ma Rectifier heater 5 v ±2-1/2%, 2 amps.	Power Transformer RA-20 Rectifier (**)	SC-D-1598

(**) *Used on BC-342-J only.*

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
T_3		Transformer C-228 (Continued)	Heater winding 12.5 v, min., 13.5 v max., 2 amps. c.t. Auxiliary heater supply 12.5 v ±5%, 3 amps.		
1		Dial and Gear	Dial and anti-backlash gear assembled on hub		SC-D-5431 Items 8,9, 10,11,12, 13,14 & 99
2		Shutter Assembly	Shutter and gear assembled on hub		SC-D-5431 Items 19, 20 & 99
3		Tube Socket	Ceramic, 8-prong, with retaining ring, American Phenolic Corp., #SS-8		SC-D-2538 Item 63
4		Tube Socket	Molded phenolic, American Phenolic Corp., #SP-8	RA-20 Rectifier (**)	SC-D-1612 Item 24
5		Socket SO-94	14-pole, Breeze Corp.	Power and Output Connections	SC-D-2592
6		Lamp Mounting R-H	Bayonet socket and mounting bracket, American Radio Hardware, special	For Dial Lamp	SC-D-2573 Group 1
7		Lamp Mounting L-H	Same as Item 6	For Dial Lamp	SC-D-2573 Group 2
8		Jack Cover		Key	SC-D-2532 Item 36
9		Jack Cover		Microphone	SC-D-2532 Item 37
10		Jack Cover		Speaker - 2nd Audio	SC-D-2532 Item 38
11		Jack Cover		Phones - 2nd Audio	SC-D-2532 Item 39
12		Jack Cover		Phones - 1st Audio	SC-D-2532 Item 40

(**) *Used on BC-342-J only.*

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
13		Cover	Aluminum Die Casting	Cover for SO-94 Plug	SC-D-2532 Item 6
14		Binding Post		Alternate Signal Antenna	SC-D-2532 Item 71
15		Binding Post		Ground	SC-D-2532 Item 78
16		Fuse Post	Fuse holder with neoprene washer and nut, Littlefuse Laboratories, #1075	Holder for Active and Spare Fuses	SC-D-2532 Item 76
17		Drive Assembly	Pinion, shaft, sleeve and washers	Fast Tuning Drive	SC-D-5431 Items 44, 45,46,52
18		Knob		Fast Tuning	SC-D-5431 Item 47
19		Knob		OFF-MVC-AVC	SC-D-2532 Item 43
20		Knob		Align Input	SC-D-2532 Item 44
21		Knob		CW Oscillator Adjustment	SC-D-2561 Item 17
22		Knob		Volume	SC-D-2532 Item 45
23		Knob		Band Change	SC-D-5431 Item 56
24		Knob		Vernier	SC-D-3856
25		Knob		Crystal Phasing	SC-D-2564 Item 39
26		Nut and Ferrule Assembly		Cable Connection for Shielded Binding Post	SC-D-2578 Items 2, 3,4,9,13, 14 & 15
27		Panel Lock		Securing Panel to Box	SC-D-2532 Items 4, 5,48 & 59

Ref. No.	Stock No.	Name of Part	Description	Function	Drawing No.
28		Shaft		Removable Band Switch Shaft	SC-D-5431 Item 42
29		Spring		For Switch Detent Plunger	SC-D-5431 Item 6
30		Spring		For Anti-backlash Gears	SC-D-54-31 Item 14
31		Spring		For Tuning Capacitor Worm Gear	SC-D-5431 Item 36
32		Ball	0.218" dia. steel	For Switch Detent	SC-D-5431 Item 94
33		Screw	Taper shank, special	For securing Dial Shaft	SC-D-5431 Item 4
34		Screw	#10-32 pilot point, headless	For securing Switch Shaft	SC-D-5431 Item 85
35		Insulator Assembly	Feed through type, special	For Leads through R-F and Osc. Box Assemblies	SC-D-2553 Items 4,5, 40 & 50
36		Insulator Assembly	Feed through type, special	For Leads through Mounting Shelf	SC-D-2538 Items 28, 29,90 & 93
37		Glass		For Dial Window	SC-D-2532 Item 13

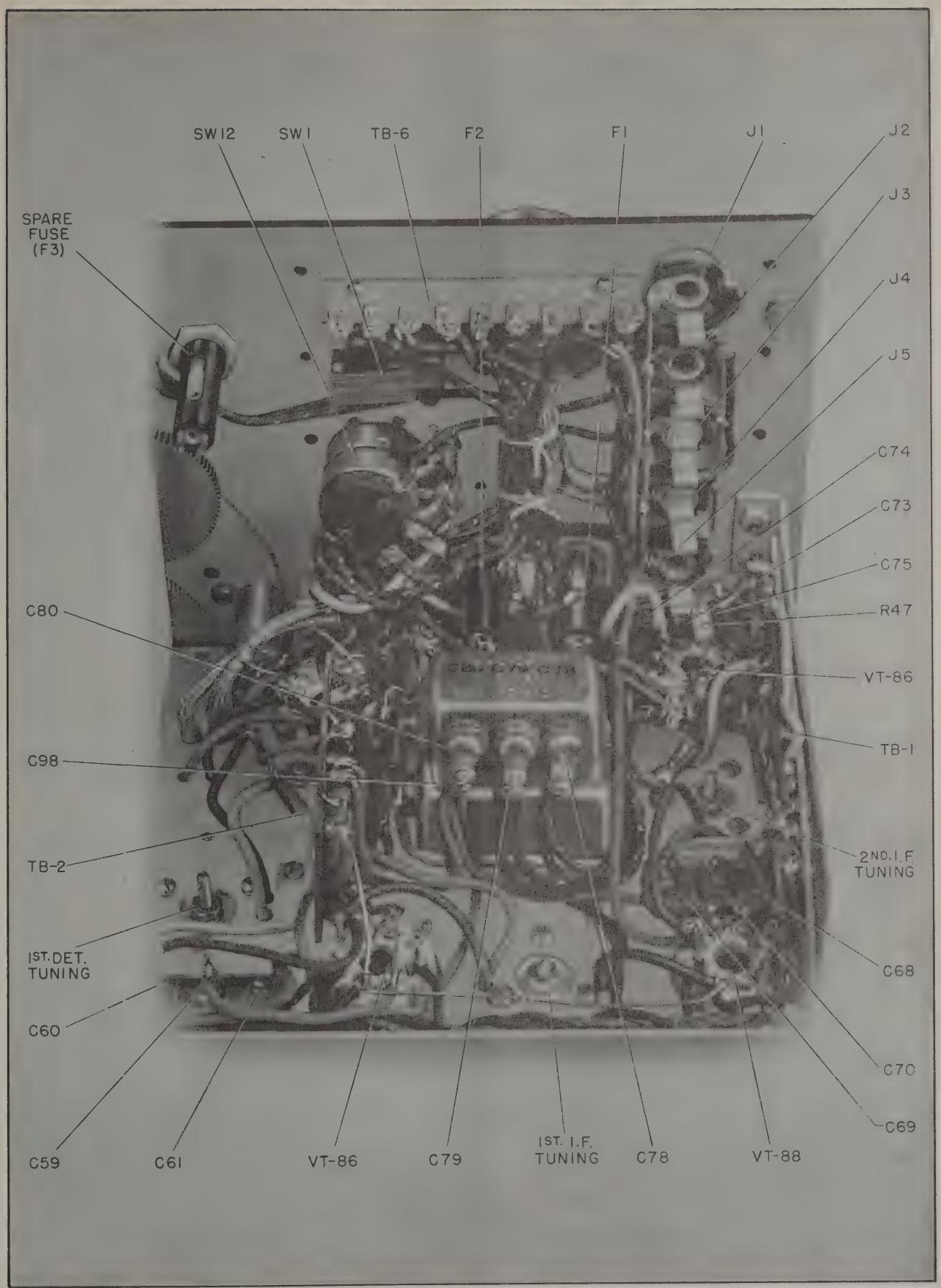


FIGURE 16—RECEIVER CHASSIS,
BOTTOM OBLIQUE VIEW, RIGHT-HAND END

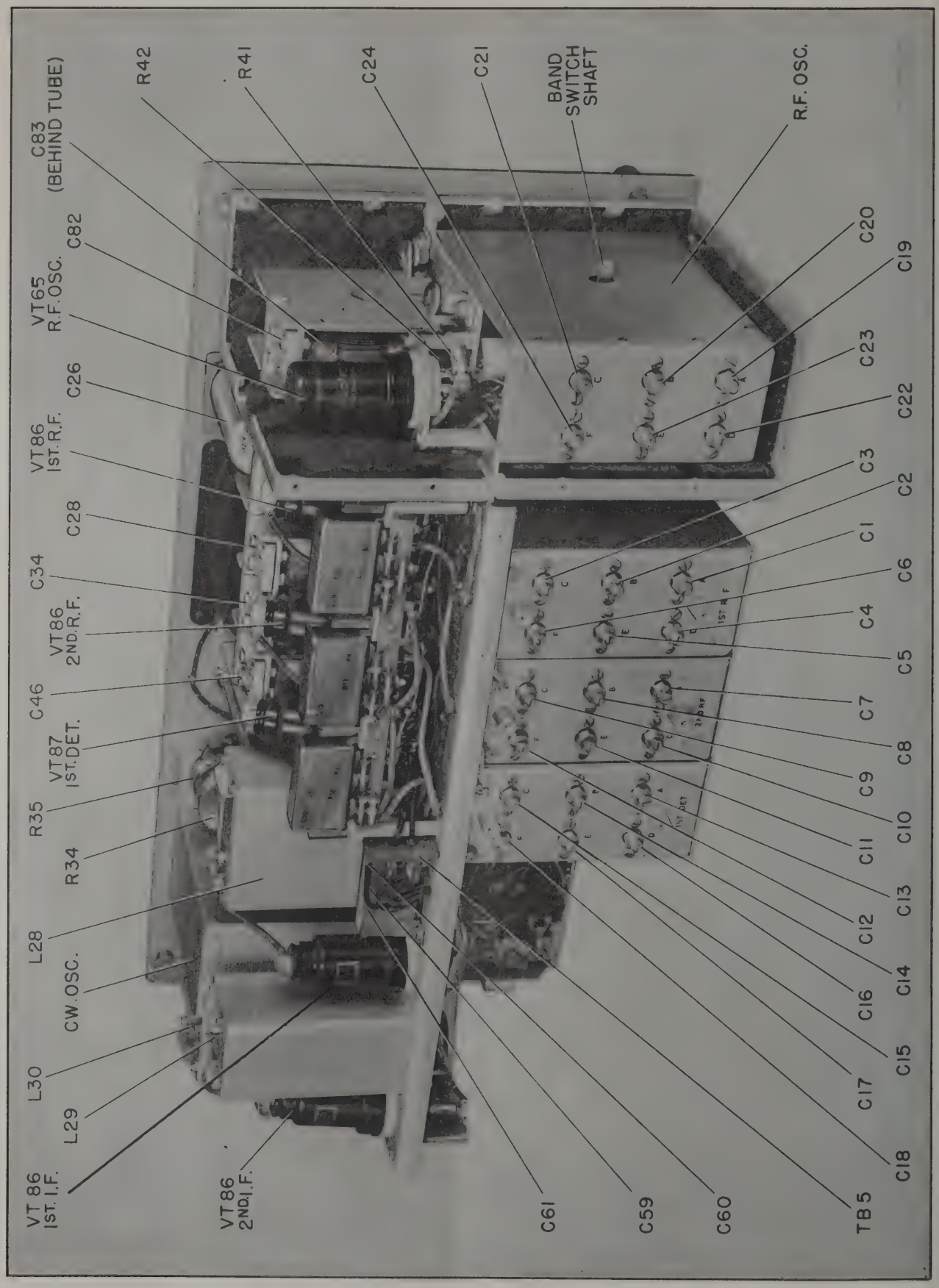


FIGURE 17—RECEIVER CHASSIS,
REAR VIEW, SHIELDS AND POWER SUPPLY ASSEMBLY REMOVED

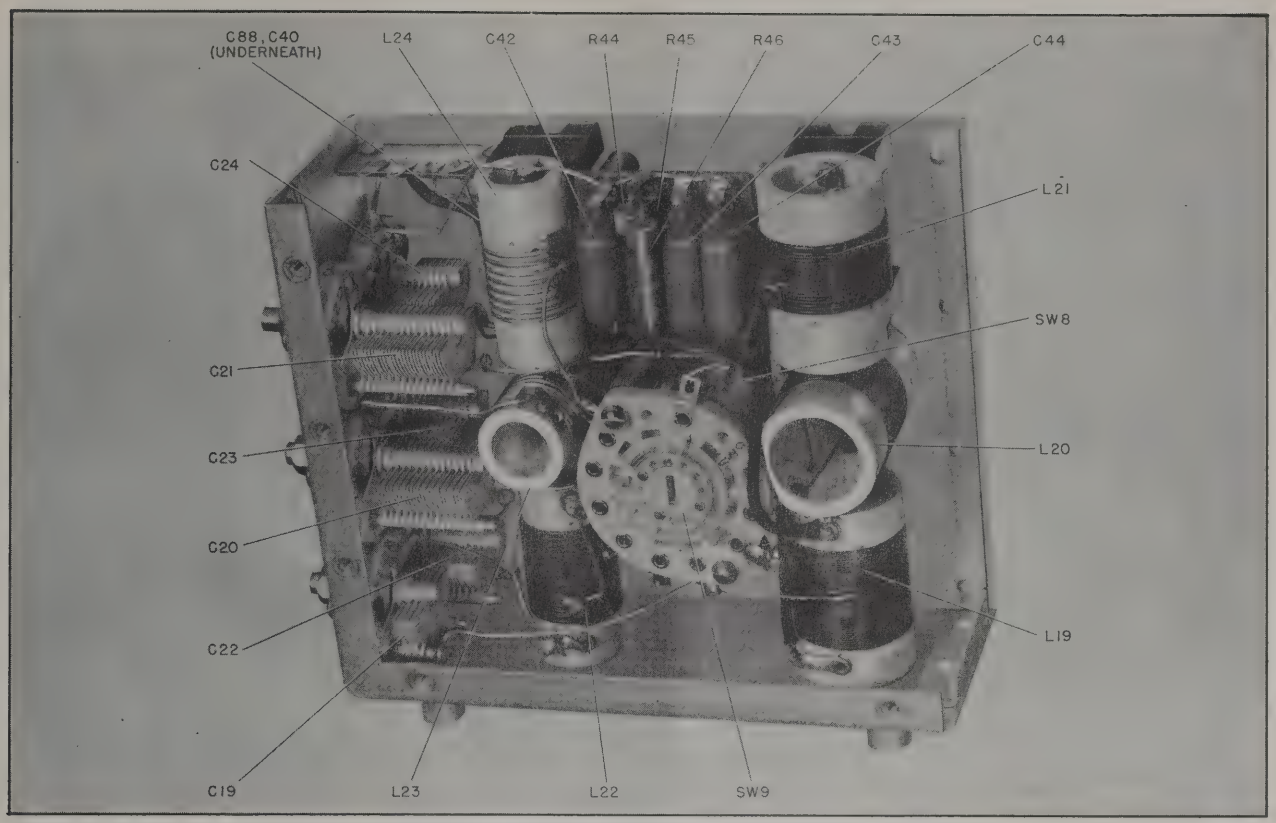


FIGURE 18—R-F OSCILLATOR TUNING UNIT,
OBLIQUE VIEW, RIGHT-HAND SIDE, SHIELD REMOVED

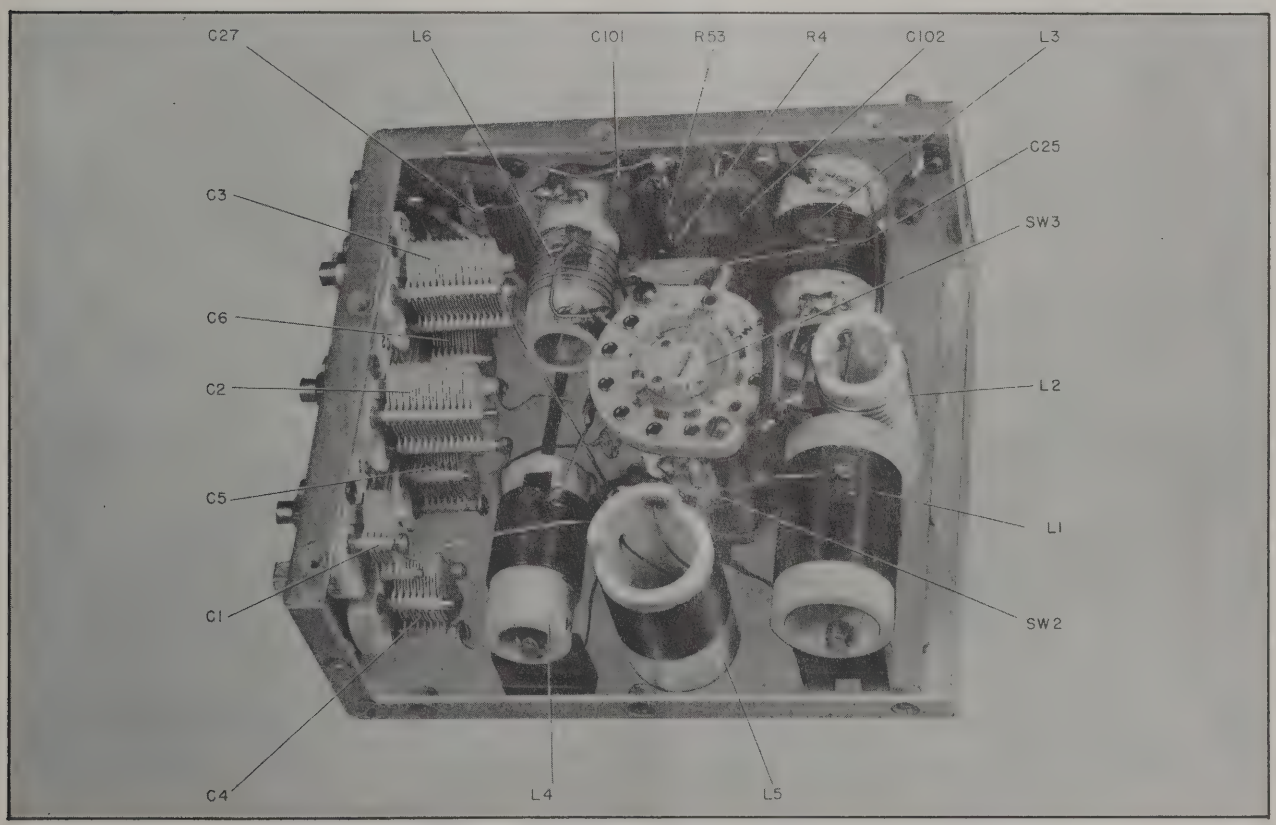


FIGURE 19—1ST R-F TUNING UNIT,
OBLIQUE VIEW, RIGHT-HAND SIDE, SHIELD REMOVED

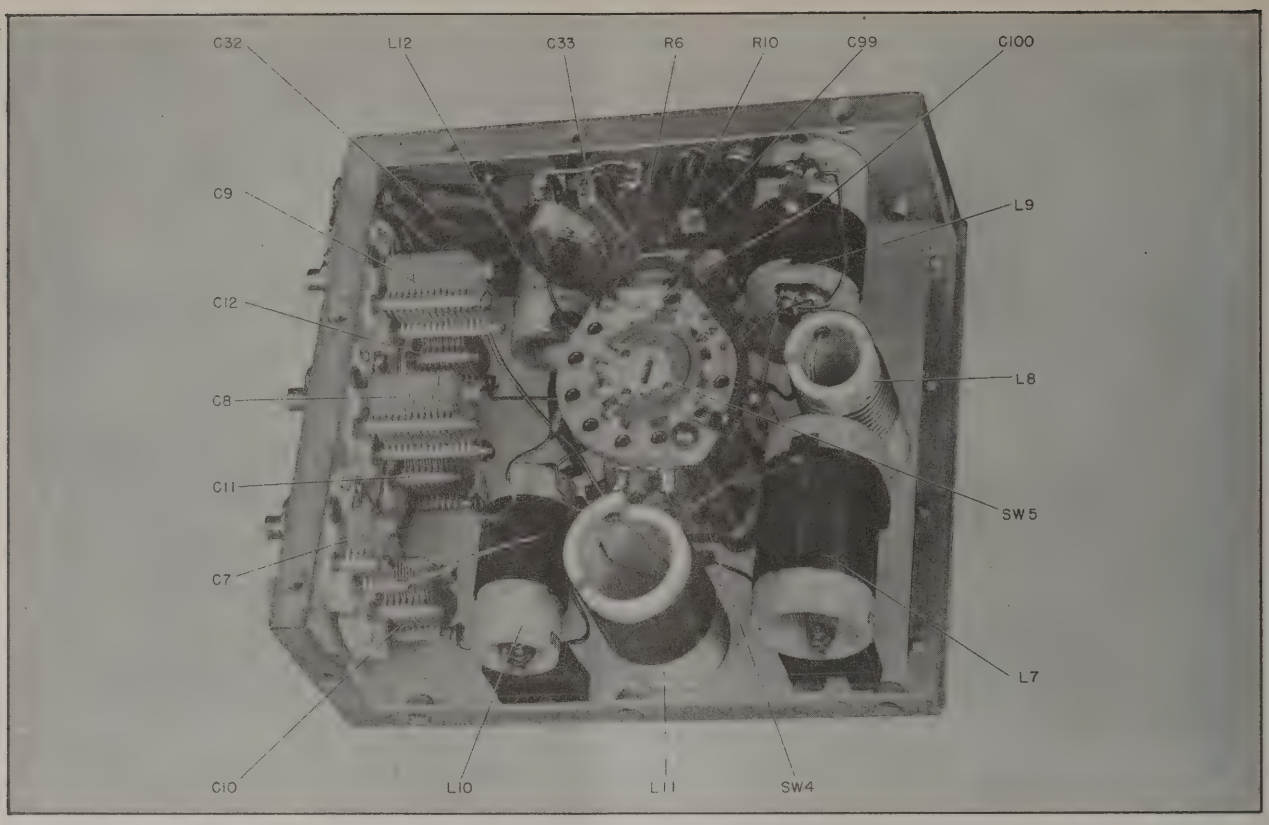


FIGURE 20—2ND R-F TUNING UNIT,
OBLIQUE VIEW, RIGHT-HAND SIDE, SHIELD REMOVED

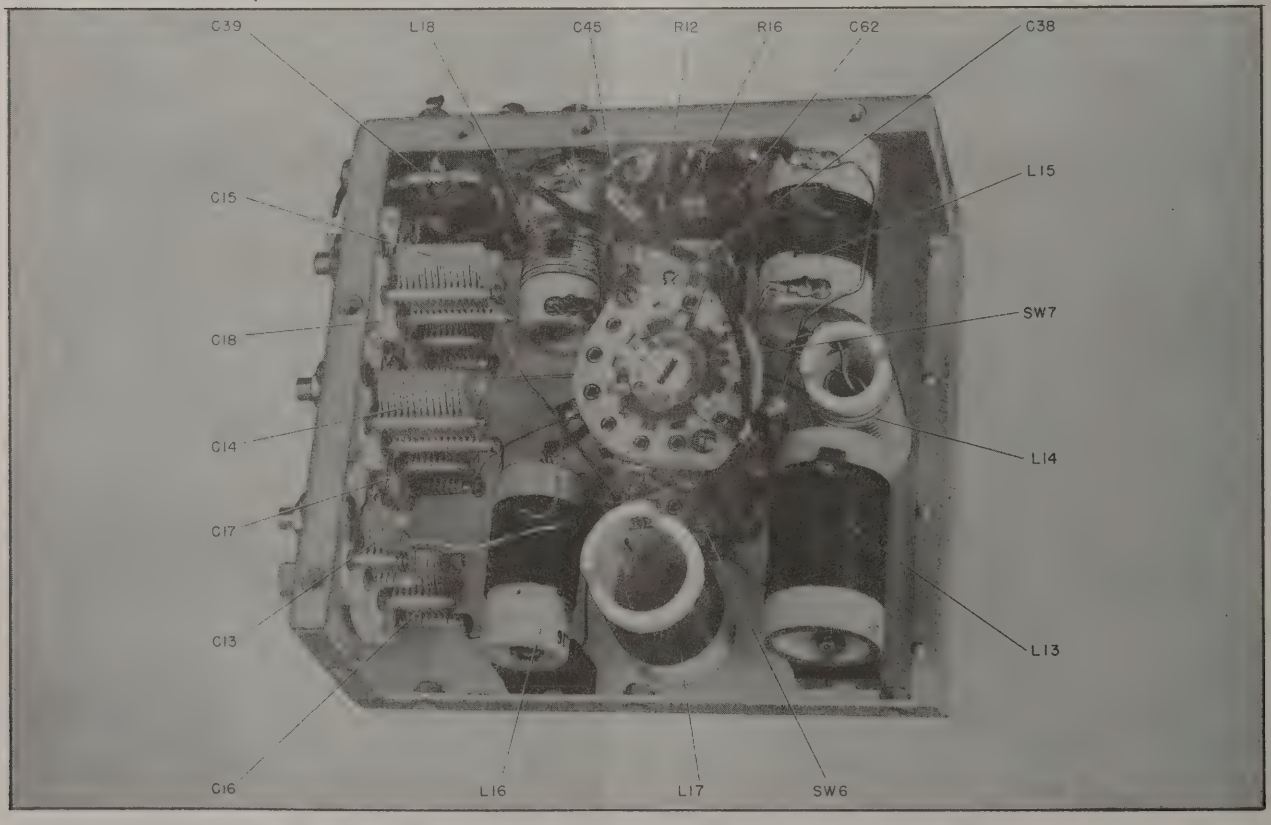


FIGURE 21—1ST DETECTOR TUNING UNIT,
OBLIQUE VIEW, RIGHT-HAND SIDE, SHIELD REMOVED

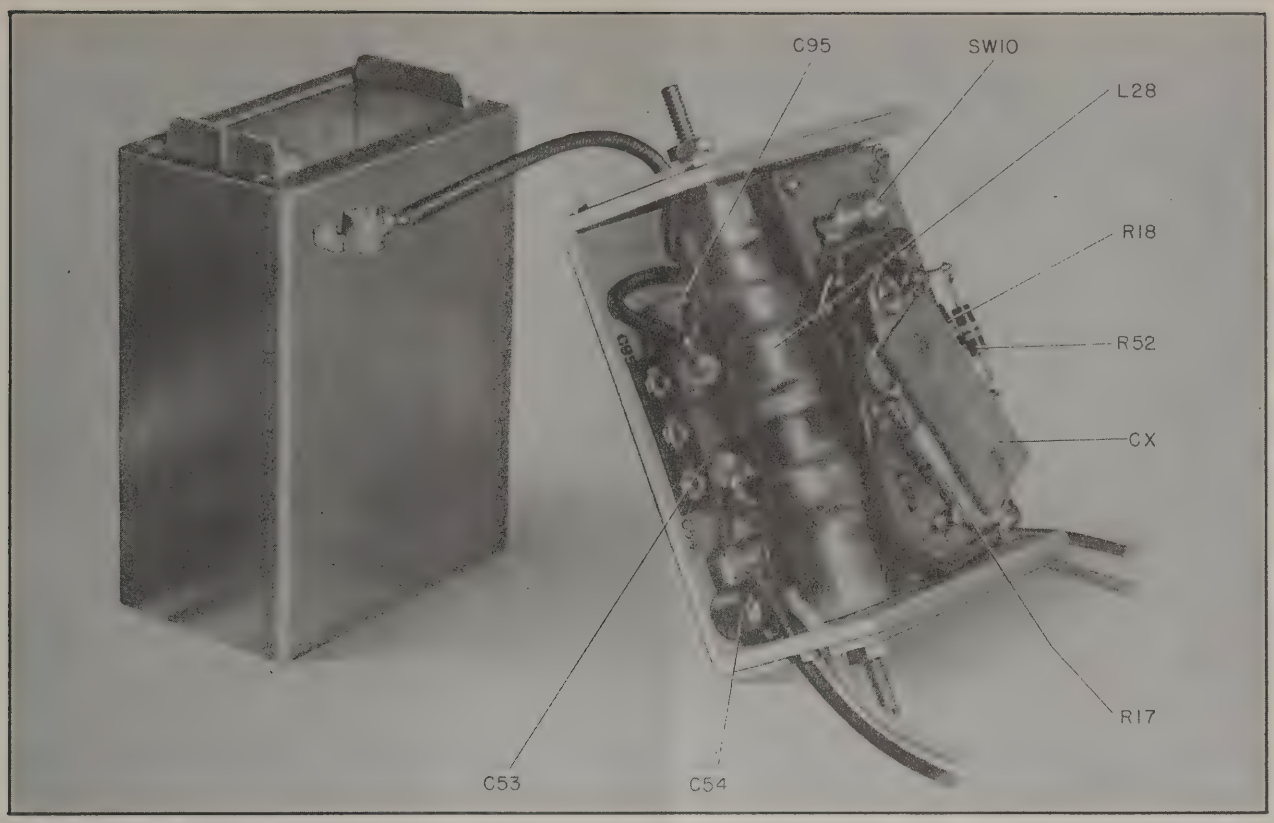


FIGURE 22—1ST DETECTOR TRANSFORMER AND CRYSTAL FILTER, REAR VIEW, RIGHT-HAND SIDE, SHIELD REMOVED

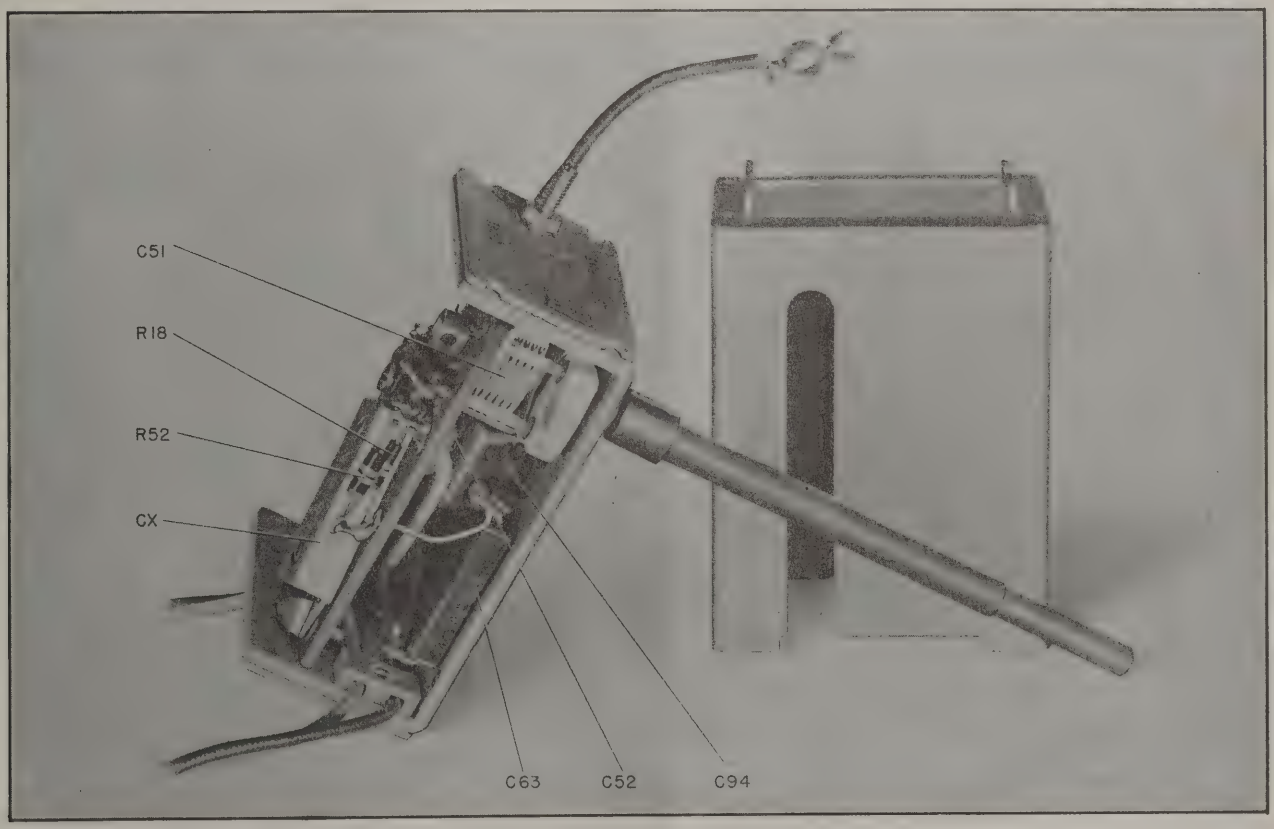


FIGURE 23—1ST DETECTOR TRANSFORMER AND CRYSTAL FILTER, LEFT-HAND SIDE VIEW, SHIELD REMOVED

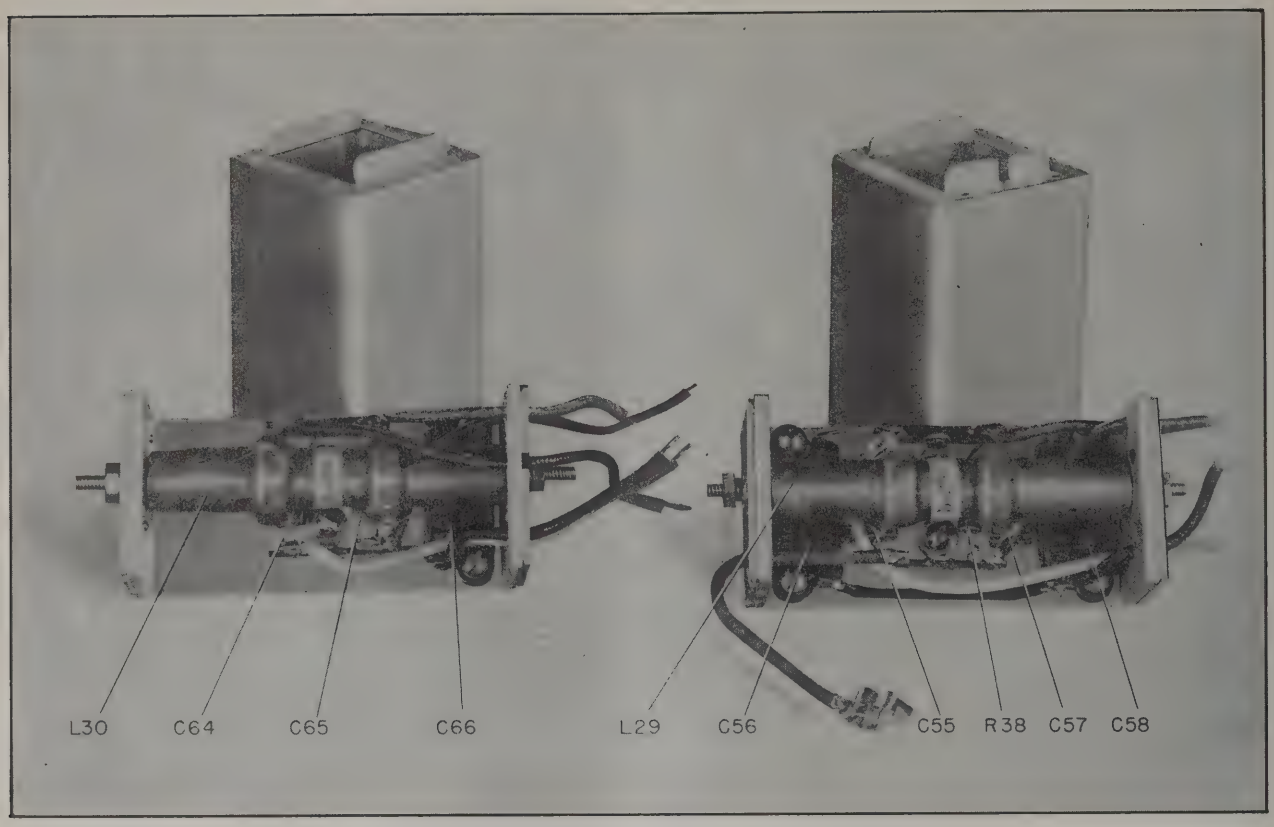


FIGURE 24—1ST AND 2ND I-F TRANSFORMERS,
SHIELDS REMOVED

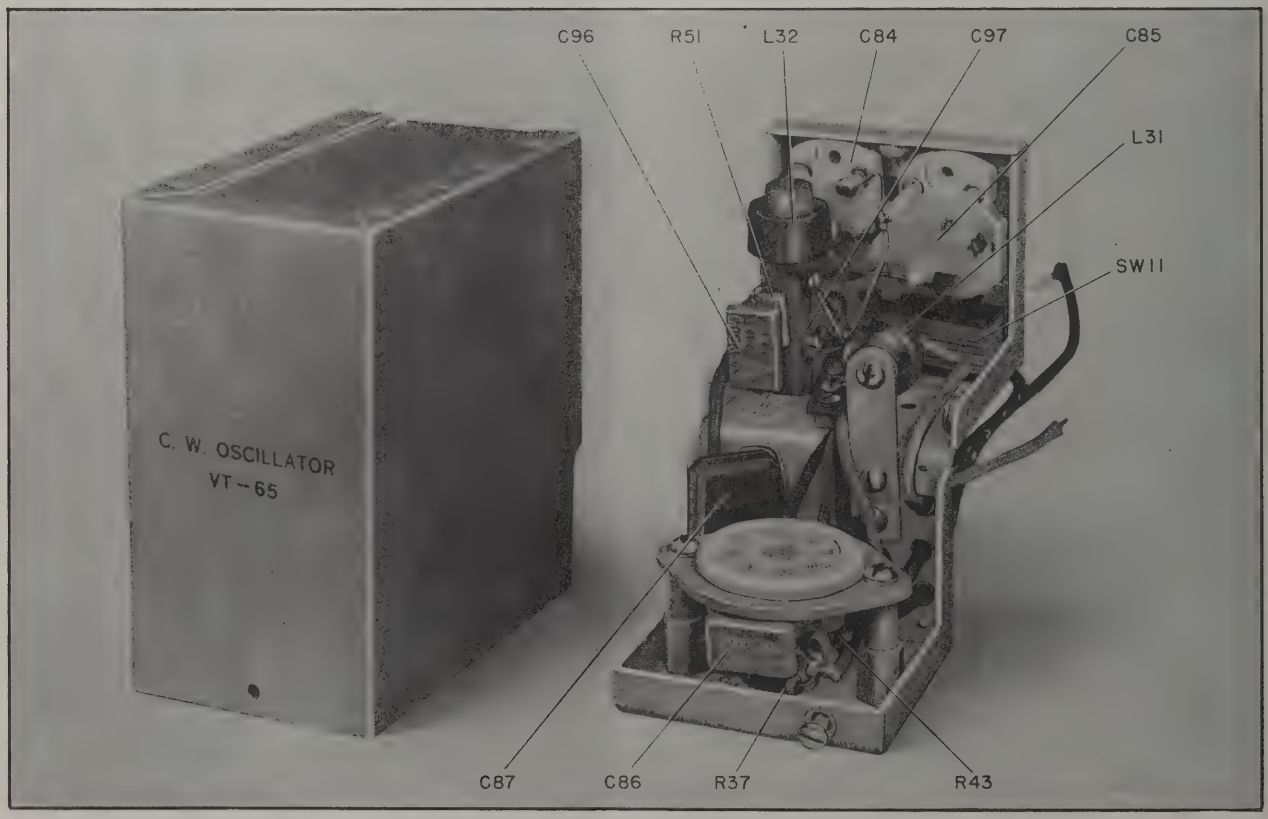


FIGURE 25—C-W OSCILLATOR UNIT,
REAR VIEW, SHIELD REMOVED

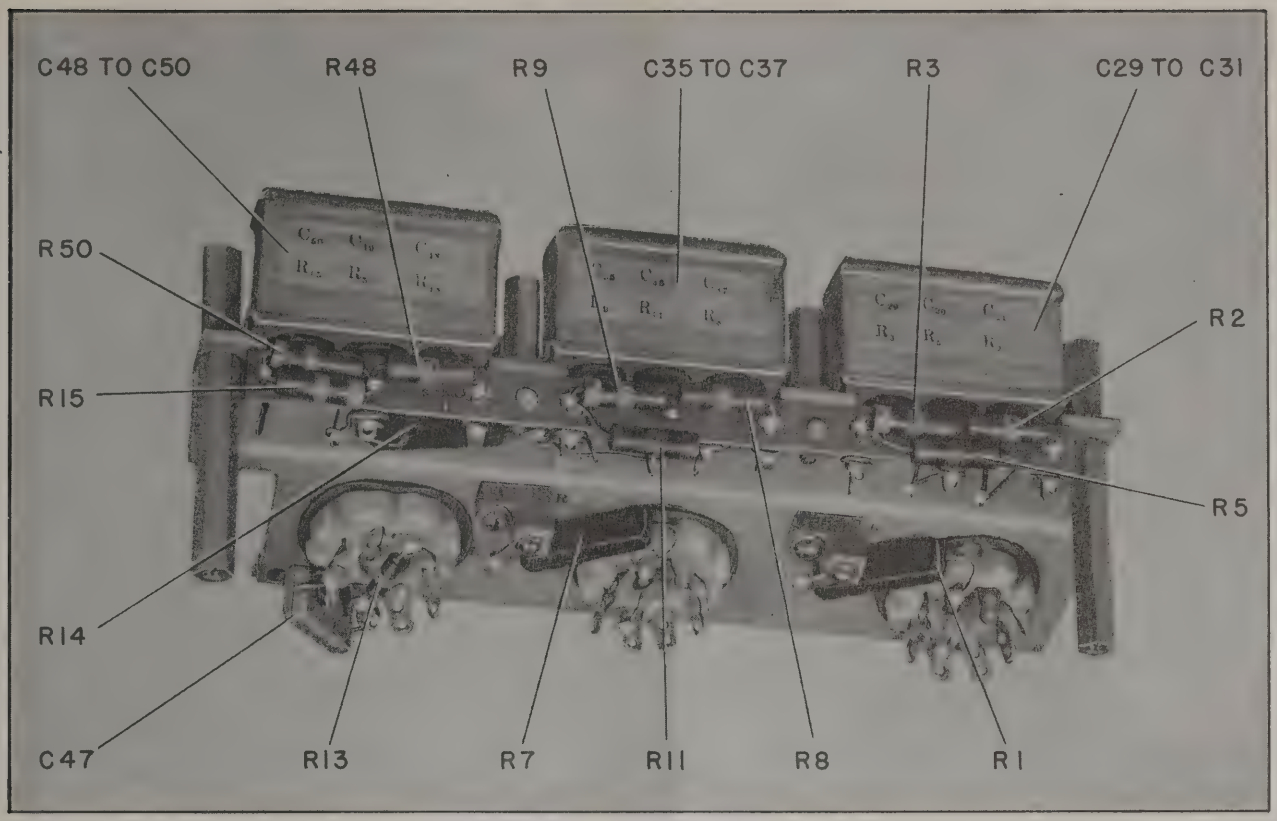


FIGURE 26—R-F TUBE SHELF, REAR VIEW

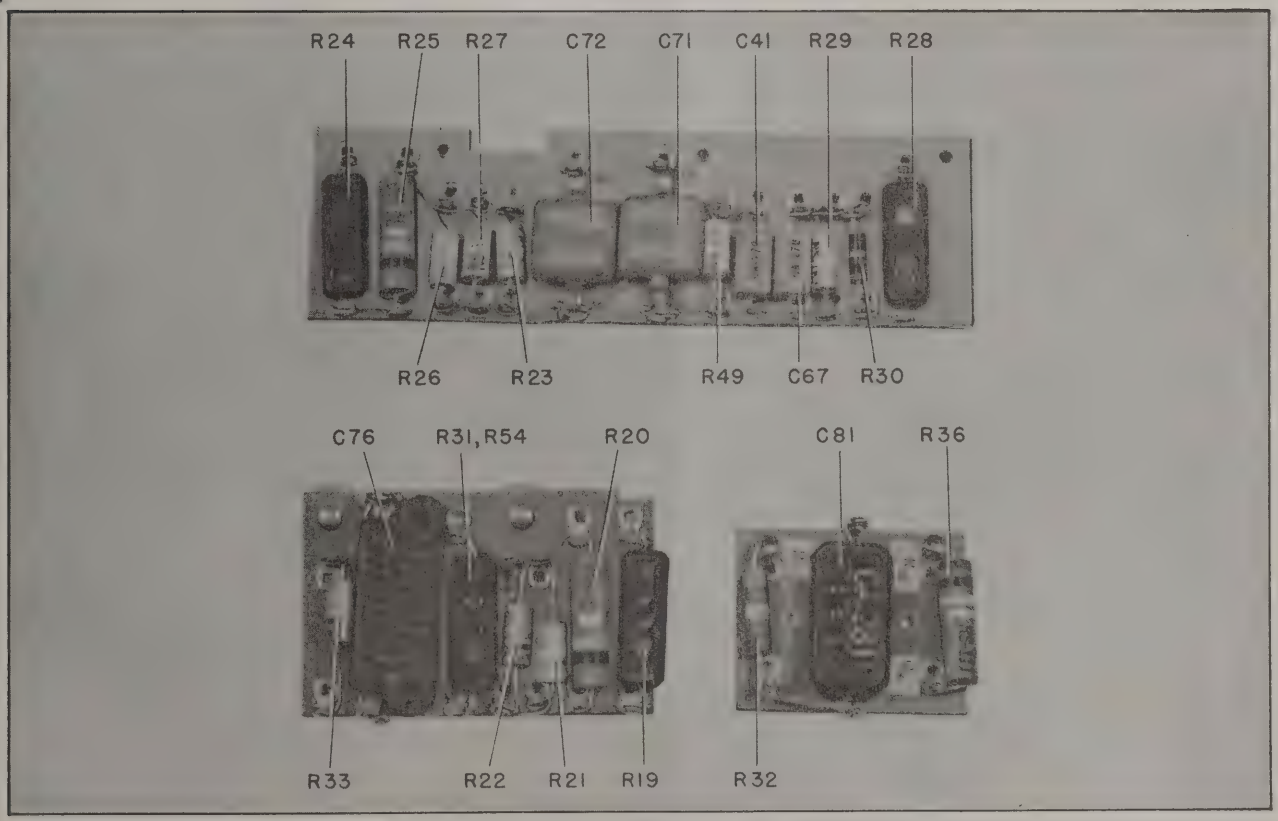


FIGURE 27—TERMINAL BOARD ASSEMBLIES

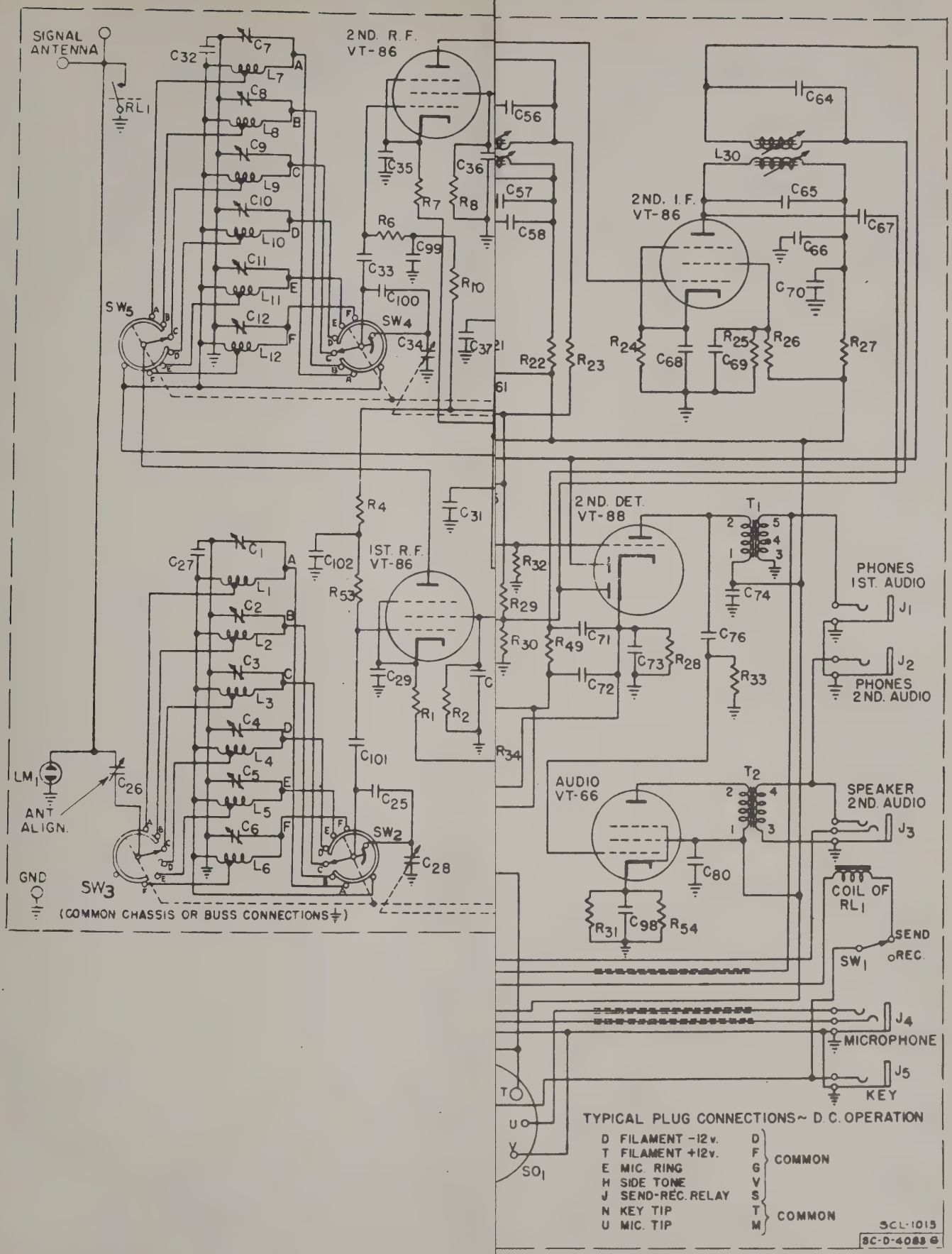


FIGURE 28—RADIO RECEIVER BC-312-J, SCHEMATIC DIAGRAM

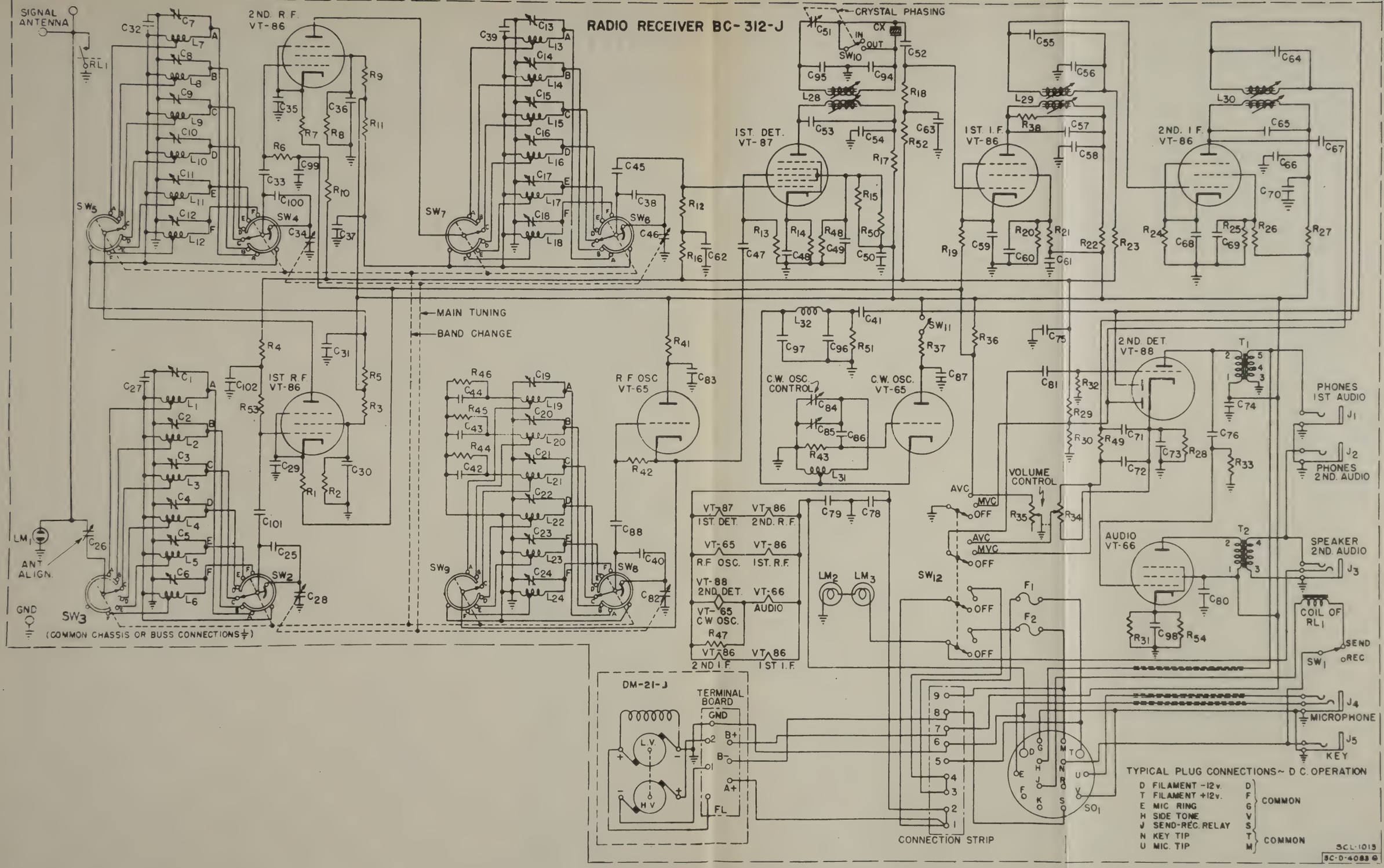


FIGURE 28—RADIO RECEIVER BC-312-J, SCHEMATIC DIAGRAM

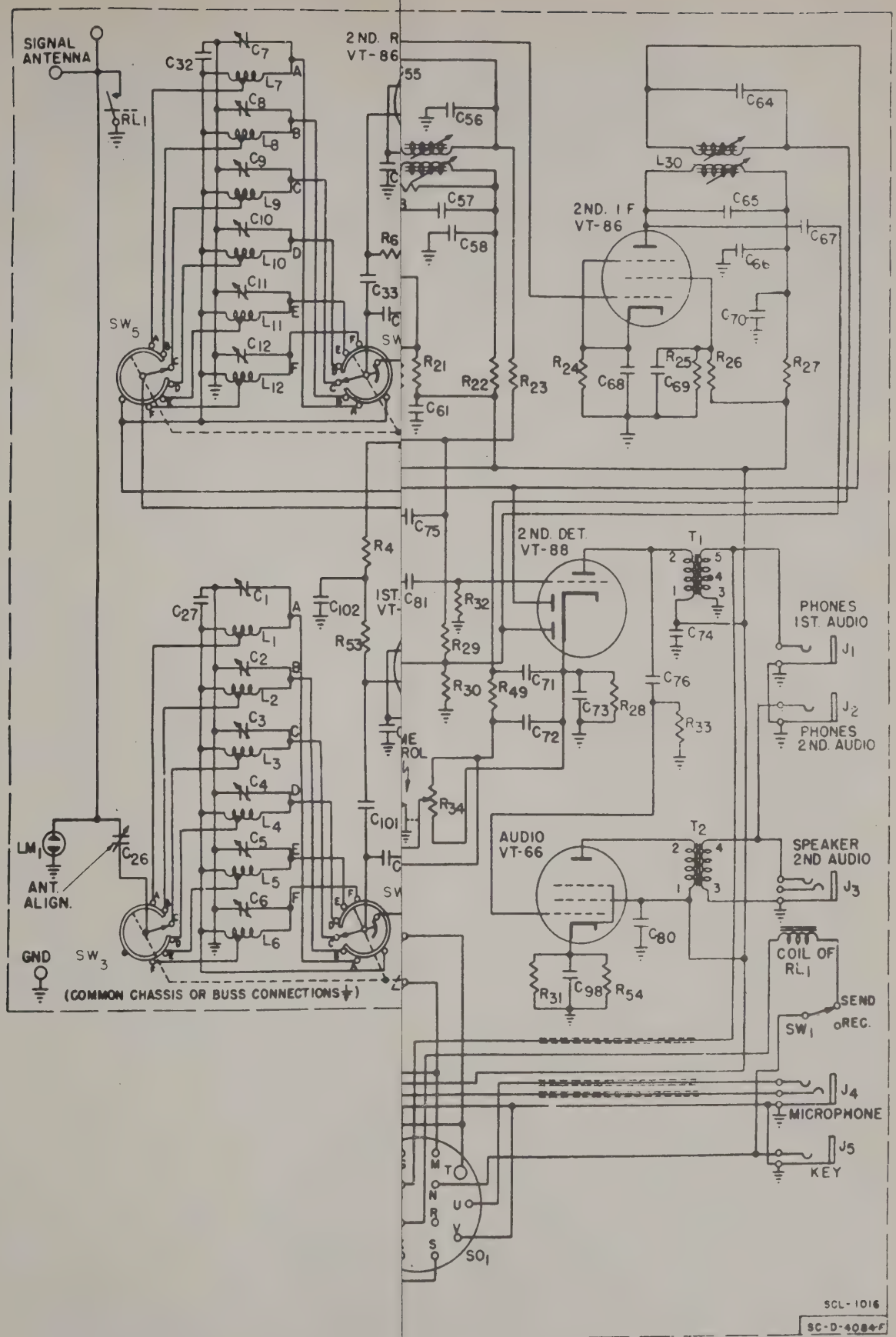


FIGURE 29—RADIO RECEIVER BC-342-J, SCHEMATIC DIAGRAM

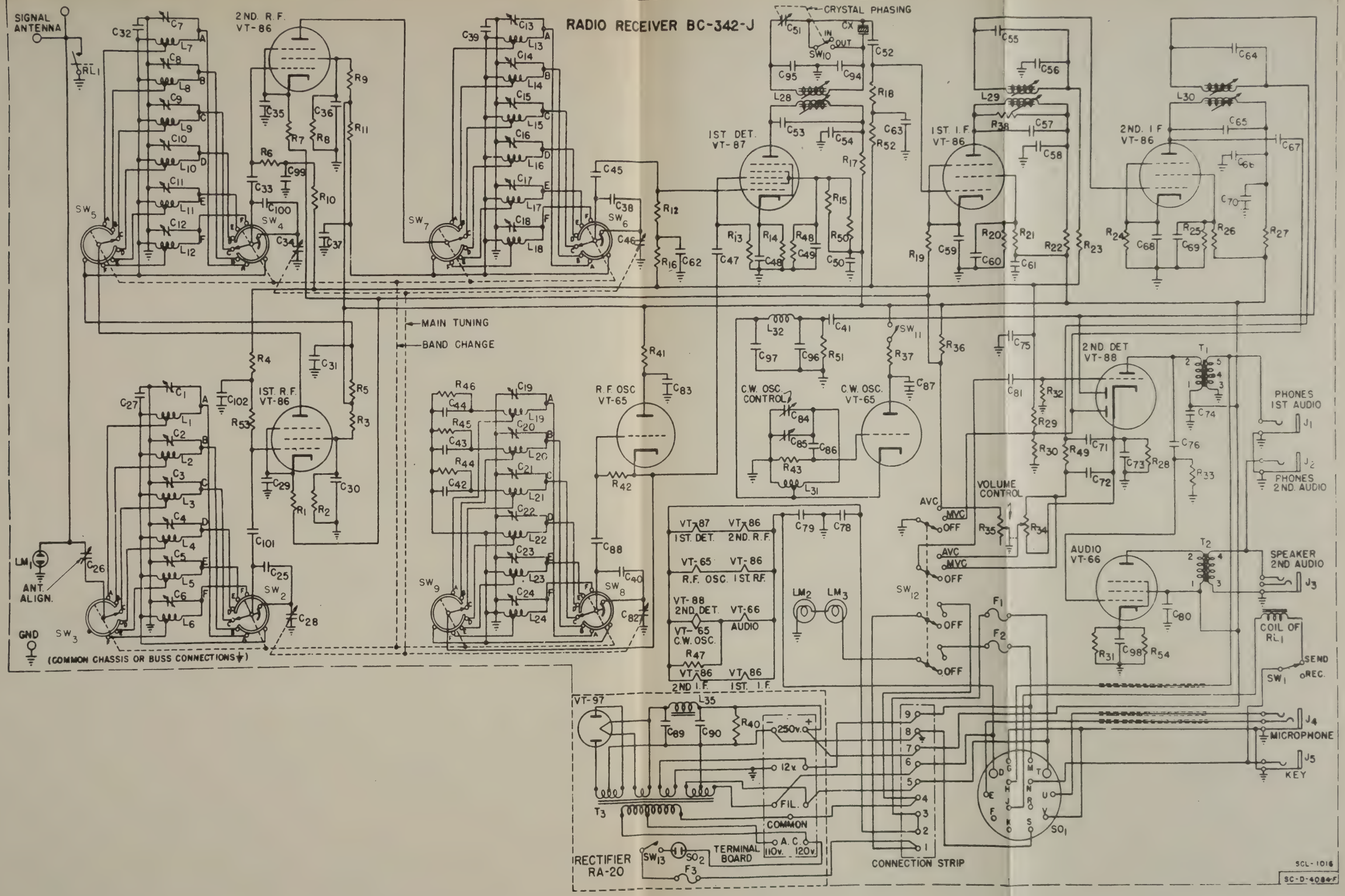
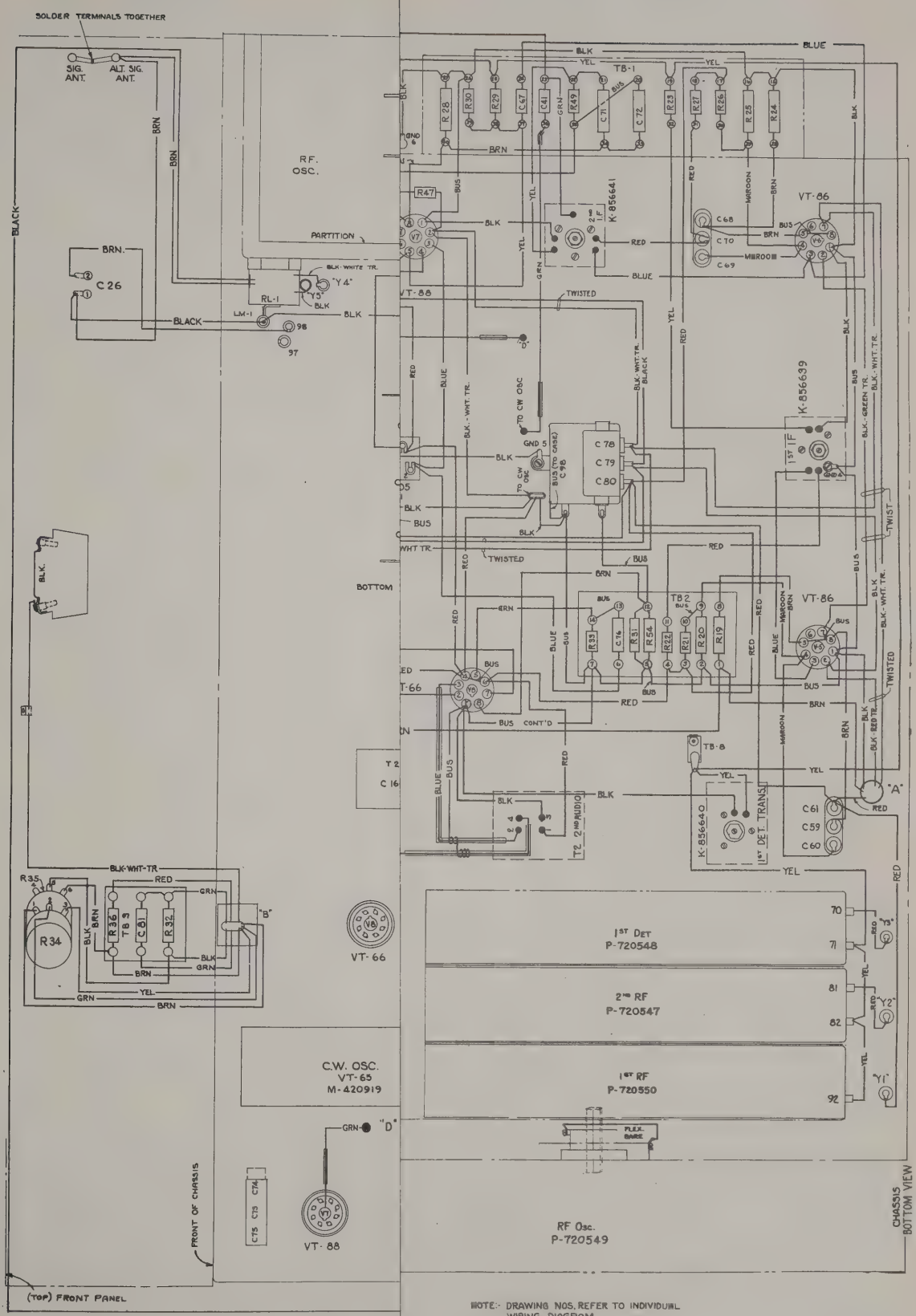
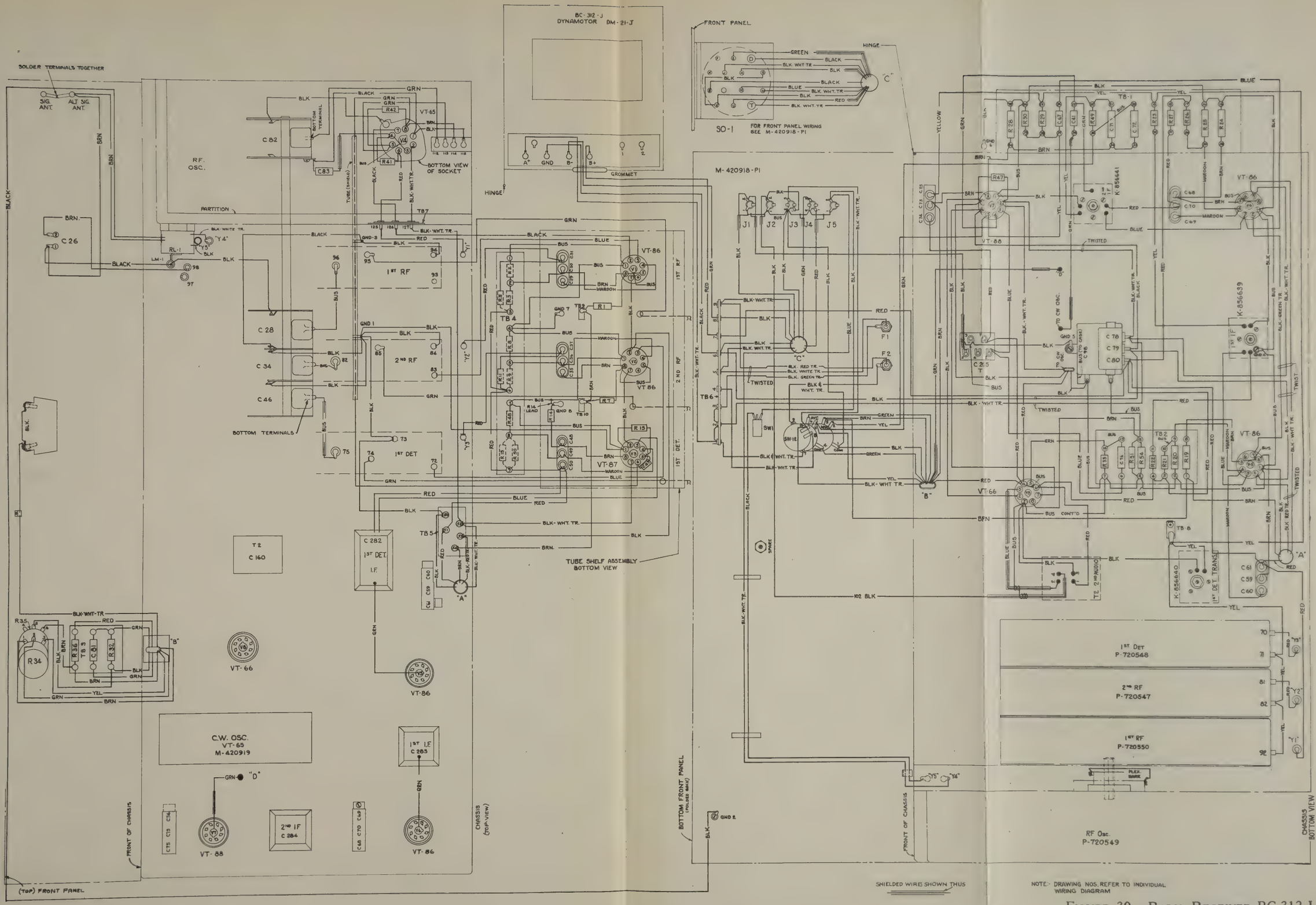


FIGURE 29—RADIO RECEIVER BC-342-J, SCHEMATIC DIAGRAM



NOTE:- DRAWING NOS. REFER TO INDIVIDUAL WIRING DIAGRAM

FIGURE 30—RADIO RECEIVER BC-312-J, WIRING DIAGRAM



NOTE:- DRAWING NOS. REFER TO INDIVIDUAL WIRING DIAGRAM

FIGURE 30—RADIO RECEIVER BC-312-J, WIRING DIAGRAM

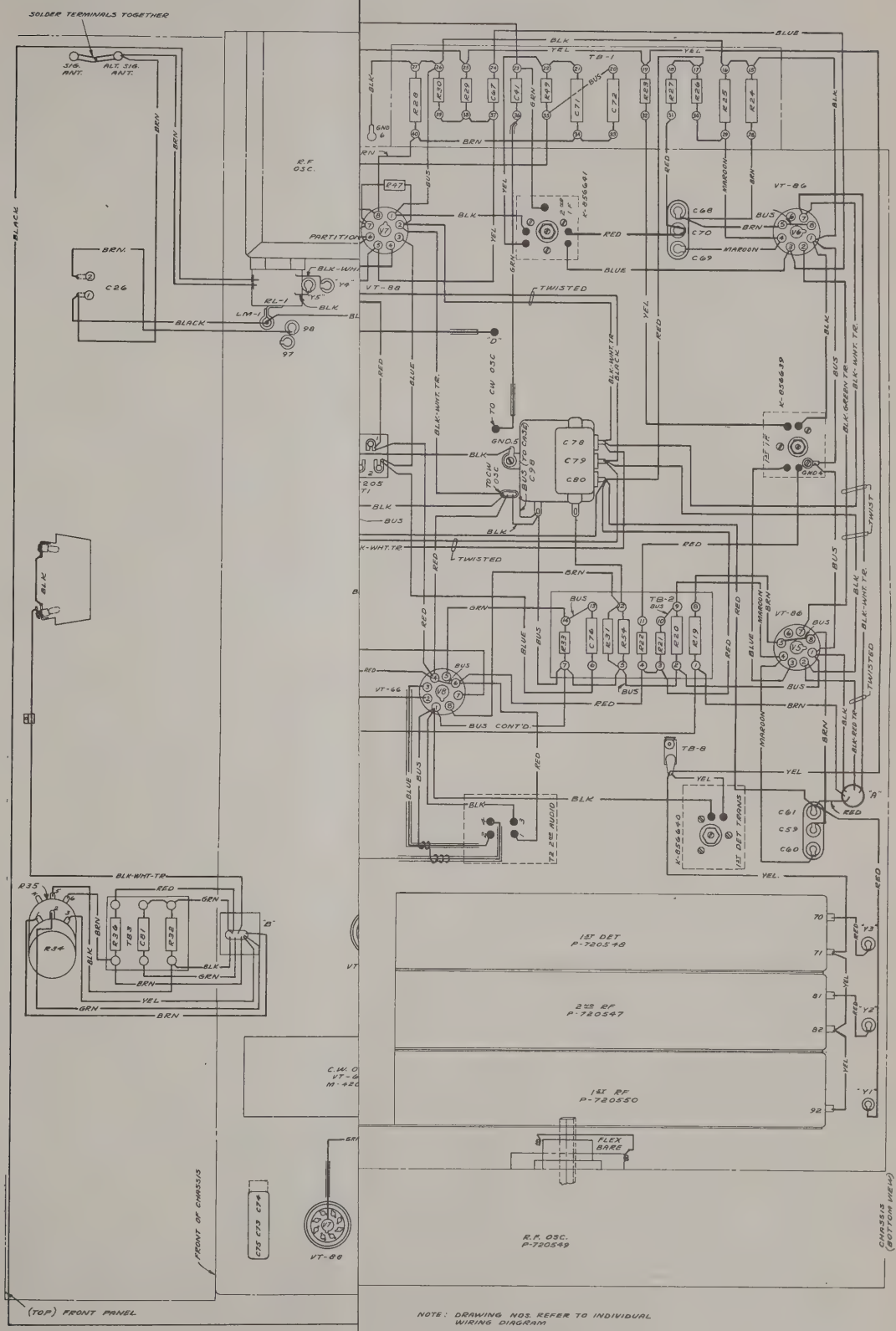
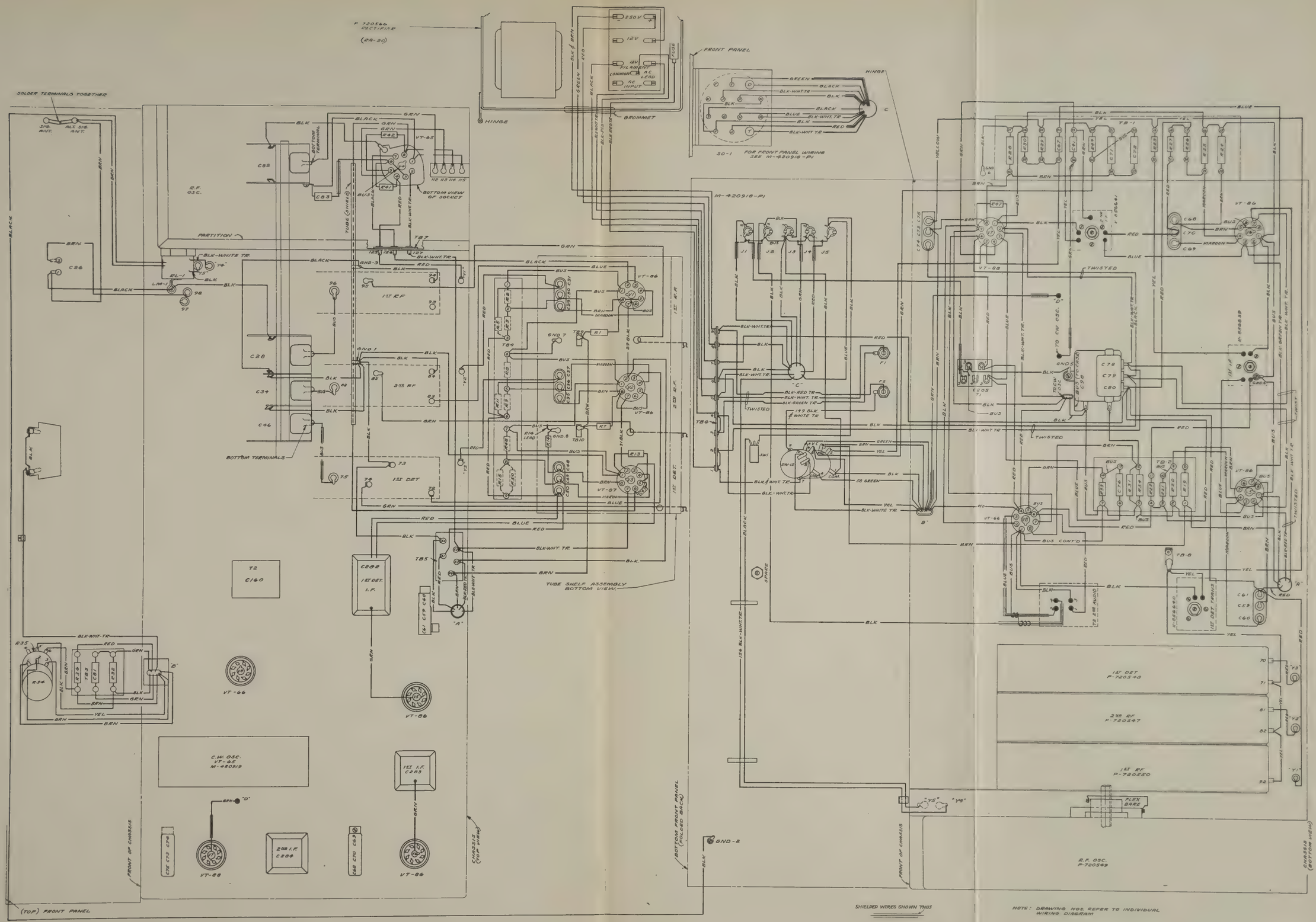


FIGURE 31—RADIO RECEIVER BC-342-J, WIRING DIAGRAM



NOTE: DRAWING NOS. REFER TO INDIVIDUAL WIRING DIAGRAM

FIGURE 31—RADIO RECEIVER BC-342-J, WIRING DIAGRAM

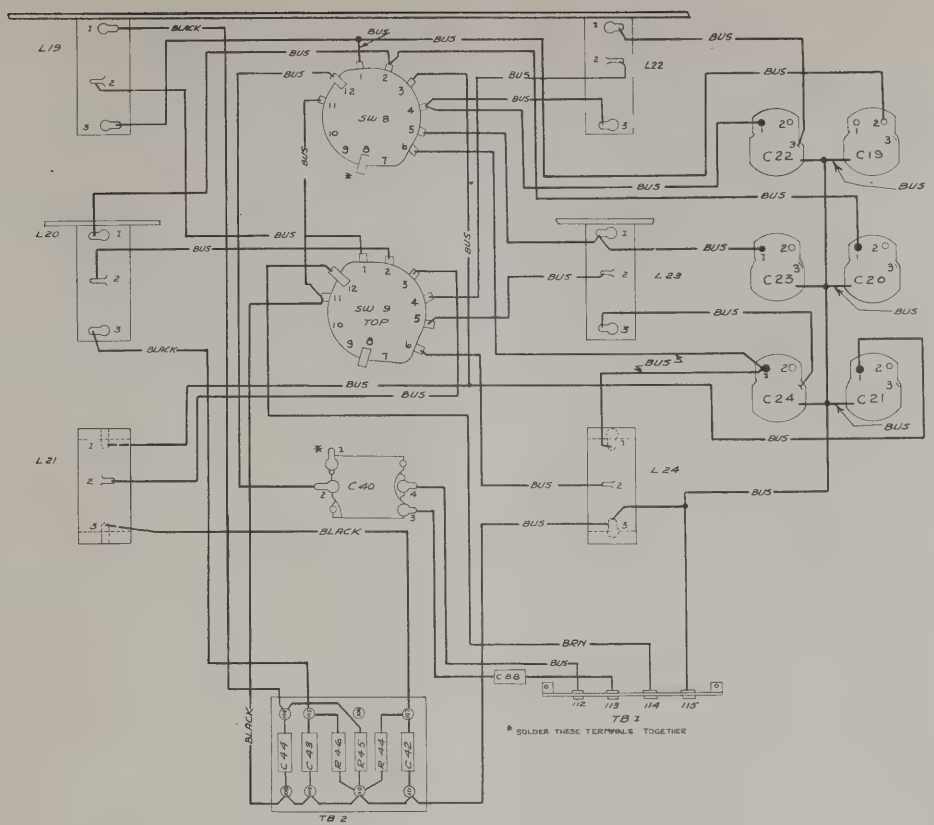


FIGURE 32—R-F OSCILLATOR TUNING UNIT CONNECTIONS

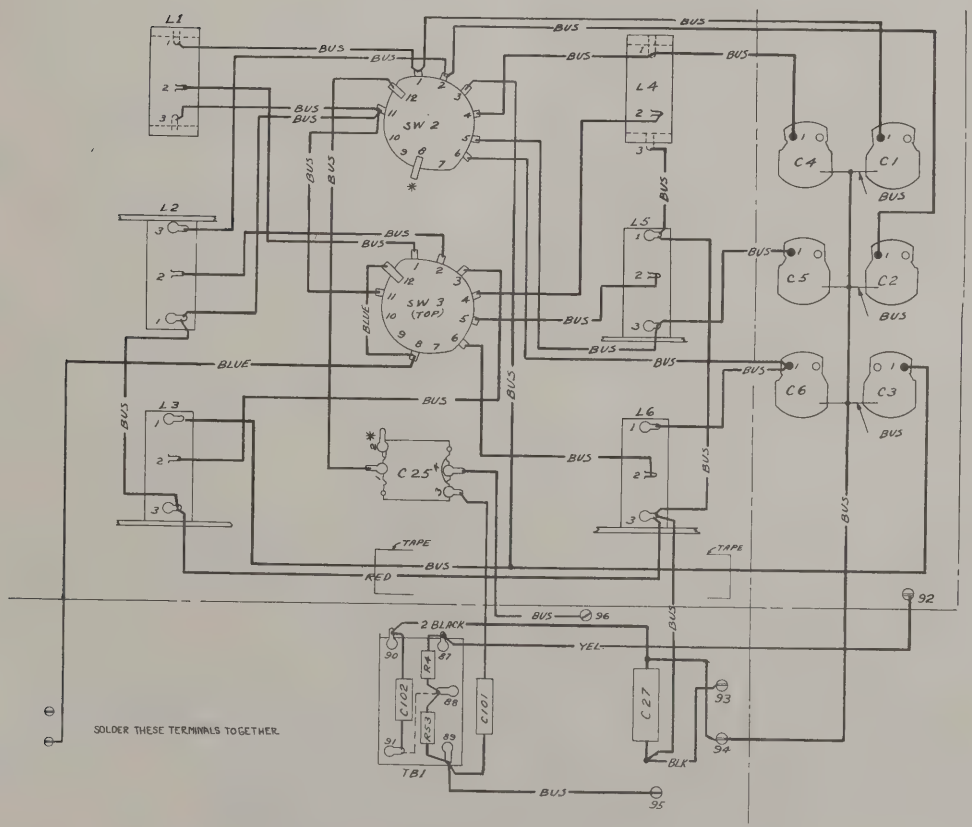


FIGURE 33—FIRST R-F TUNING UNIT CONNECTIONS

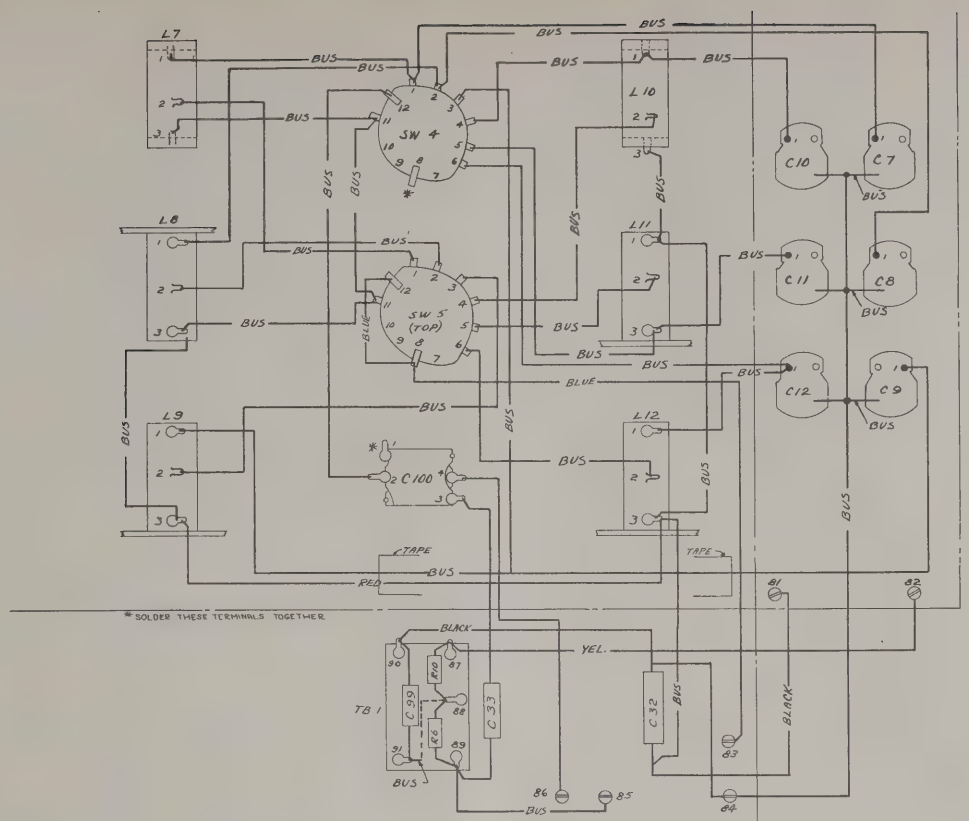


FIGURE 34—SECOND R-F TUNING UNIT CONNECTIONS

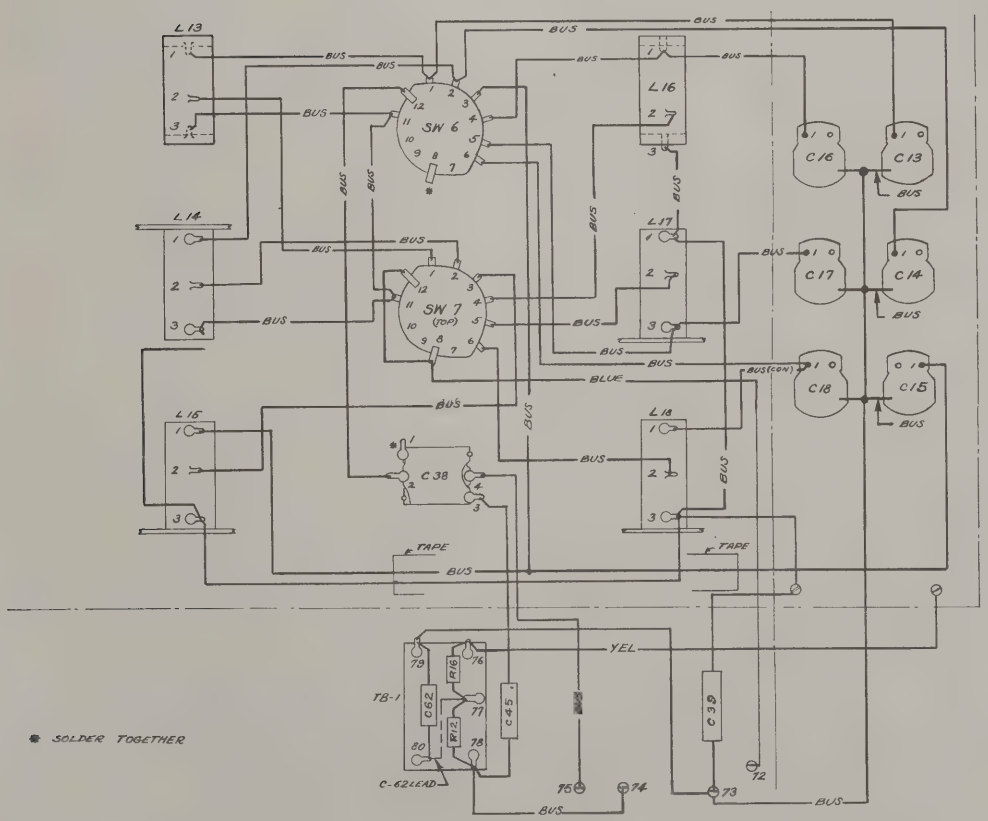


FIGURE 35—FIRST DETECTOR TUNING UNIT CONNECTIONS

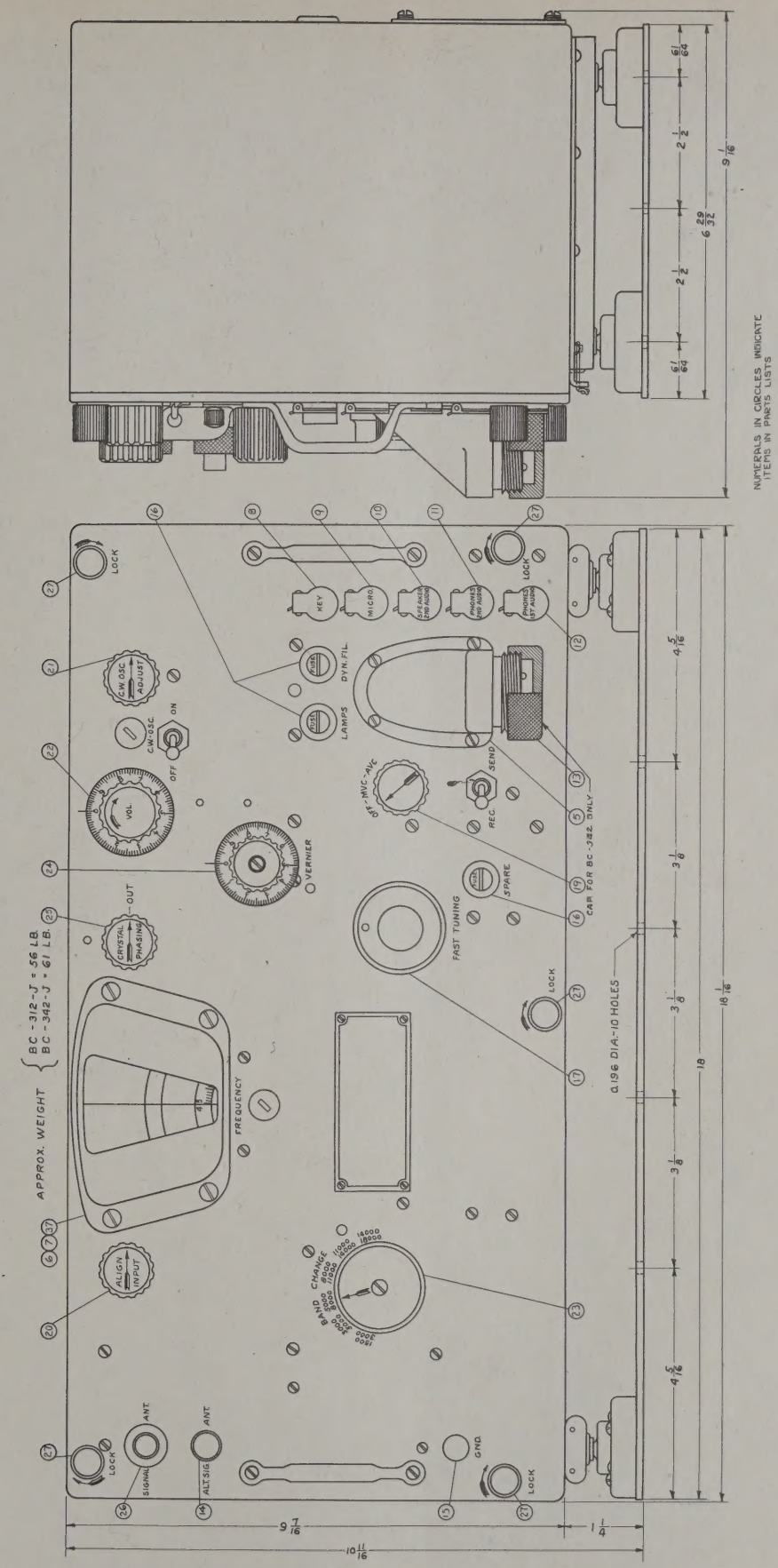


FIGURE 36—RADIO RECEIVERS BC-312-J AND BC-342-J, OUTLINE DIMENSIONS